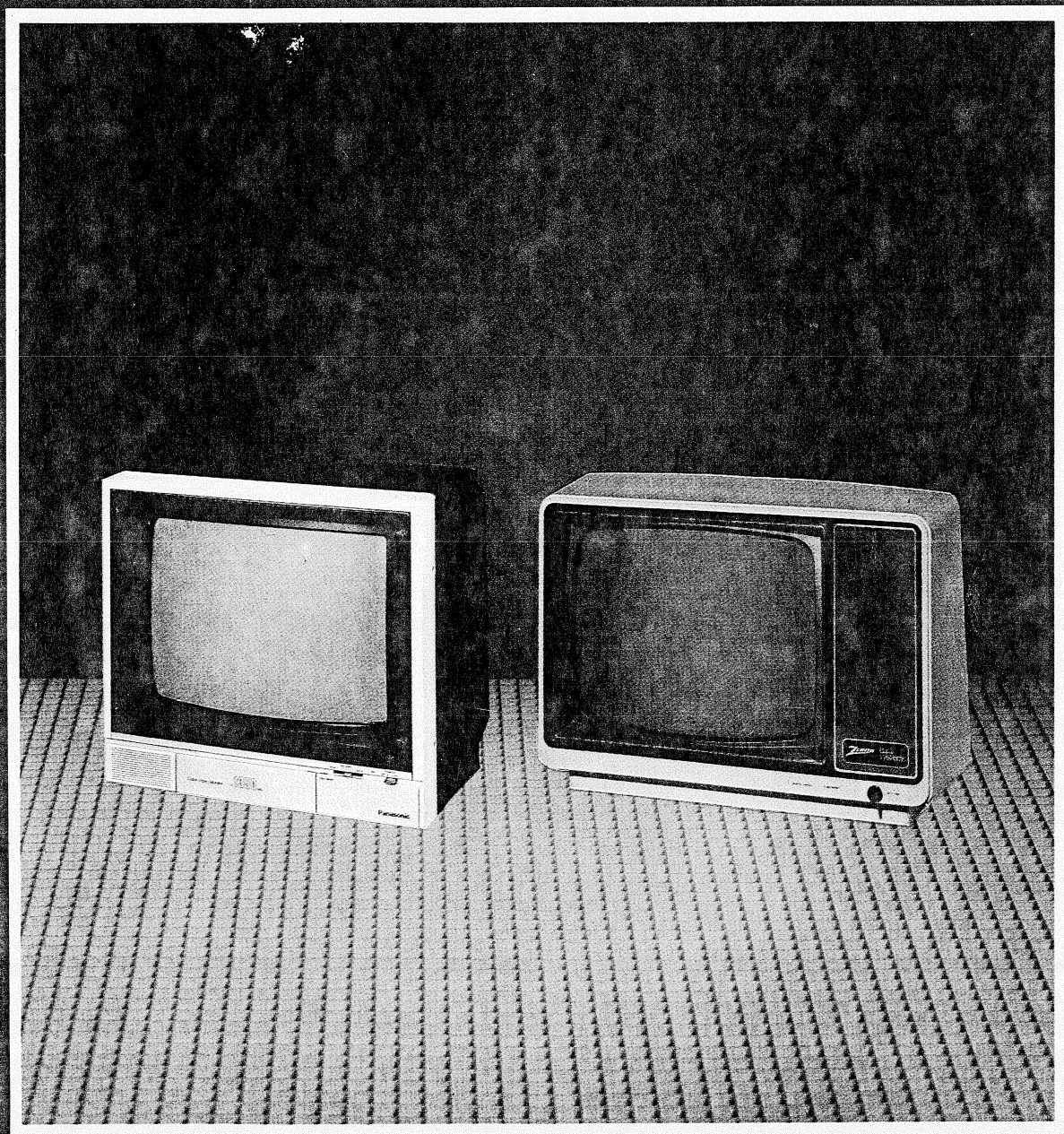
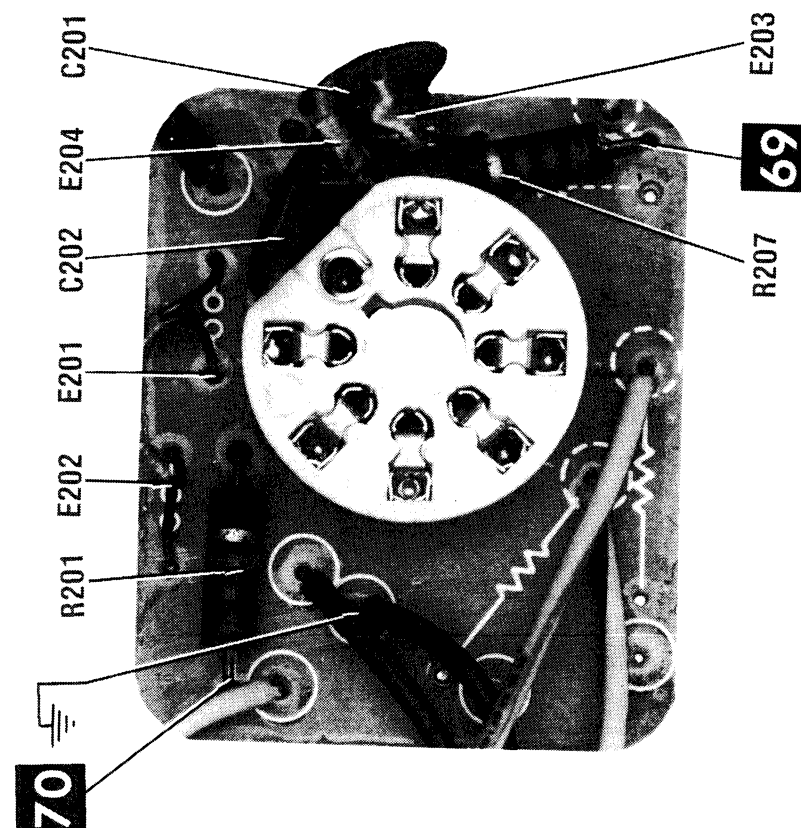


MONITOR:
PANASONIC® MODEL CT-1350MG
ZENITH® MODEL ZVM-121

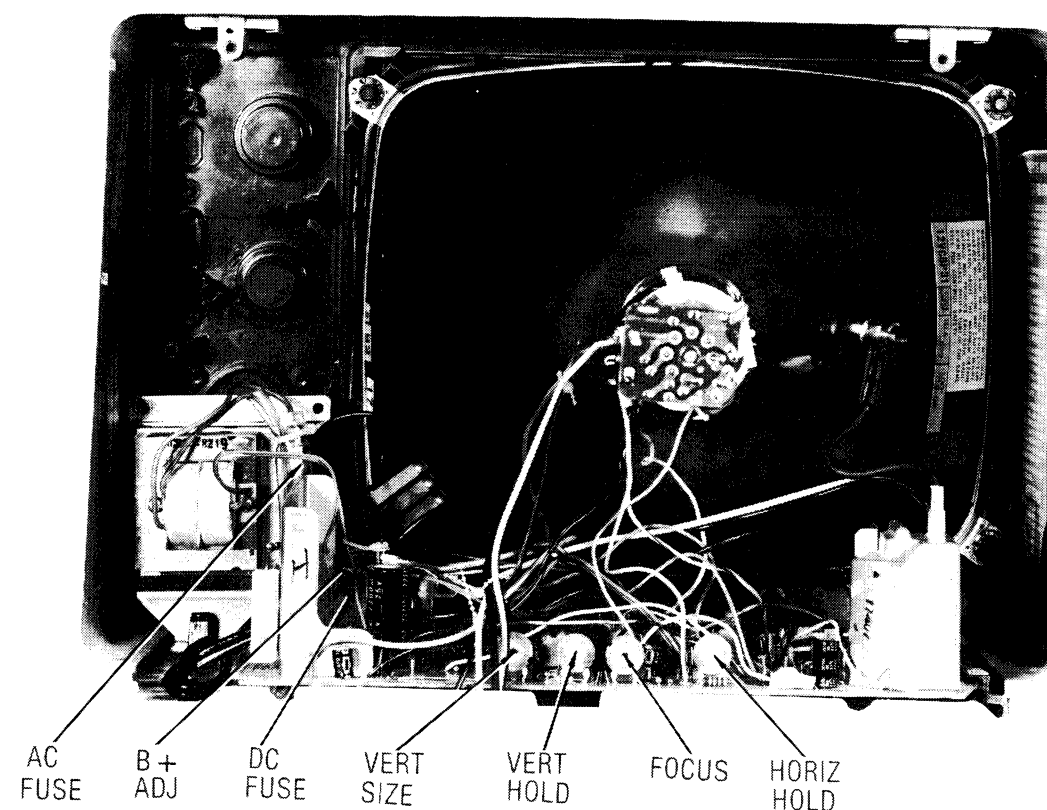


TECHNICAL SERVICE DATA FOR YOUR MONITOR



CRT SOCKET BOARD

A Howard W. Sams **CIRCUITRACE** Photo



CABINET-REAR VIEW
DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

Remove four screws holding cabinet back. Remove one screw holding video input block to cabinet back and remove cabinet back from set. Disconnect CRT socket, HV anode lead and ground wires. Loosen and remove deflection yoke from neck of CRT. Remove three screws holding power transformer to cabinet front. Carefully remove main PC board and assemblies from cabinet.

CRT REMOVAL

Follow "Chassis Removal" procedure. Then, place set face down on a soft protective surface. Remove four screws holding CRT to cabinet front. Lift CRT from cabinet. **Do not** lift CRT by the neck.

SERVICING IN THE FIELD

CRT IMPLOSION PROTECTION AND CLEANING

Implosion protection is an integral part of the picture tube, cleaning accomplished without CRT removal.

FUSE DEVICES

A 2.25-amp fuse is used for low-voltage power-supply protection. (See Placement Chart.)

A 4-amp fuse is used for AC line protection. (See Placement Chart.)

HORIZONTAL OSCILLATOR

Adjustment of the horizontal hold is accomplished by the proper setting of the horiz hold control. (See photo, Cabinet-Rear View.)

WIDTH

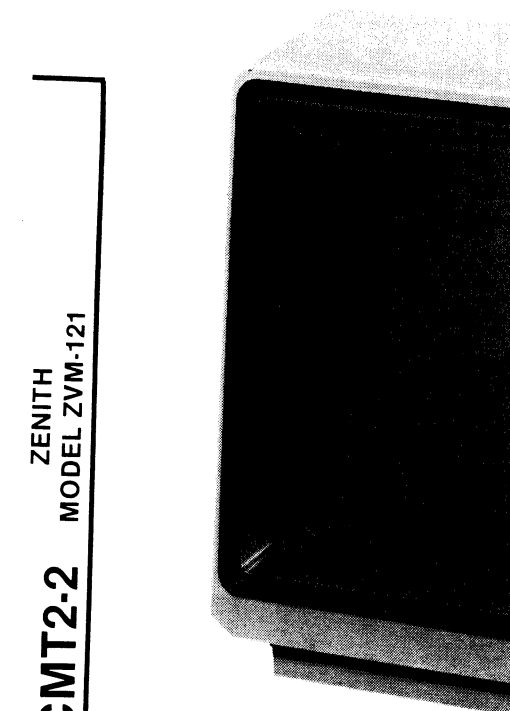
The width may be varied by width coil. (See Placement Chart.)

FOCUS

The focus may be varied by a focus control. (See photo, Cabinet-Rear View.)

CENTERING

Centering is accomplished by proper adjustment of two magnetic rings located on the yoke rear cover.

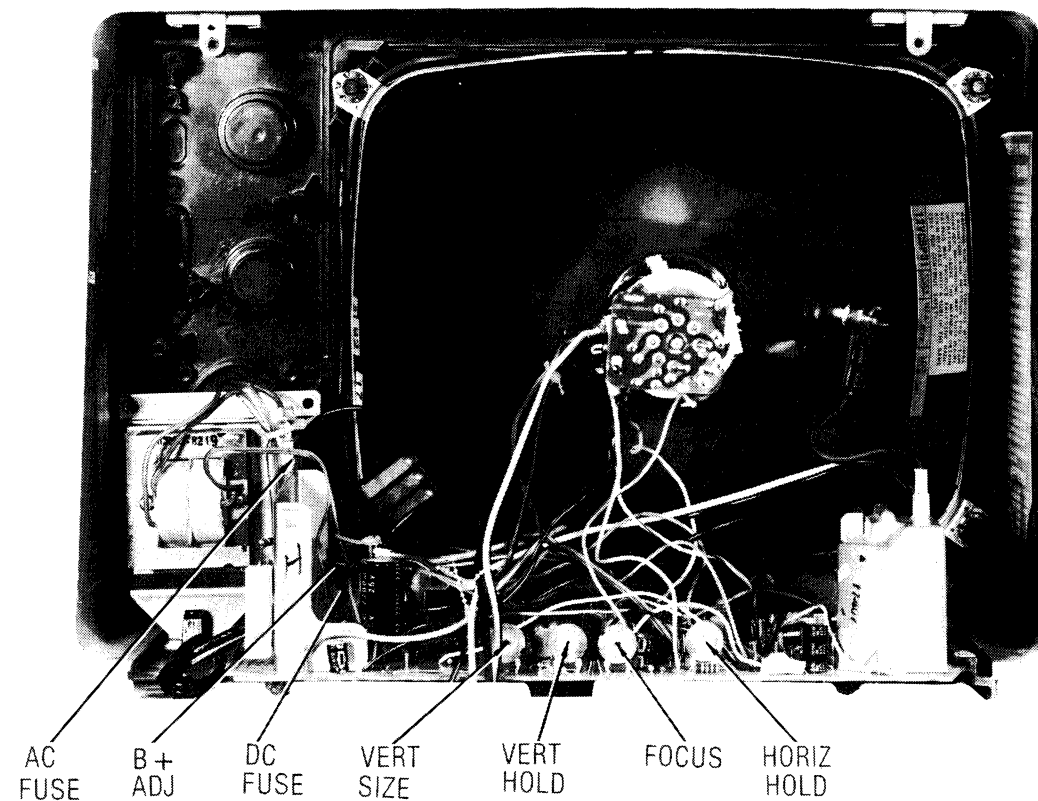


PRELIMINARY SERVICE C ENCLOSED

Adjustment	
Disassembly Instructions	
GridTrace Location Guide	
Main Board	
Parts List	
TV	
Photos	
Cabinet-Rear View	
CRT Socket Board	
Main Board	

SAMS Howard W. Sams
4300 West 62nd Str

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CABINET-REAR VIEW
DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

Remove four screws holding cabinet back. Remove one screw holding video input block to cabinet back and remove cabinet back from set. Disconnect CRT socket, HV anode lead and ground wires. Loosen and remove deflection yoke from neck of CRT. Remove three screws holding power transformer to cabinet front. Carefully remove main PC board and assemblies from cabinet.

CRT REMOVAL

Follow "Chassis Removal" procedure. Then, place set face down on a soft protective surface. Remove four screws holding CRT to cabinet front. Lift CRT from cabinet. **Do not** lift CRT by the neck.

SERVICING IN THE FIELD

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Implosion protection is an integral part of the picture tube, cleaning accomplished without CRT removal.

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Adjustment of the horizontal hold is accomplished by the proper setting of the horiz hold control. (See photo, Cabinet-Rear View.)

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The width may be varied by width coil. (See Placement Chart.)

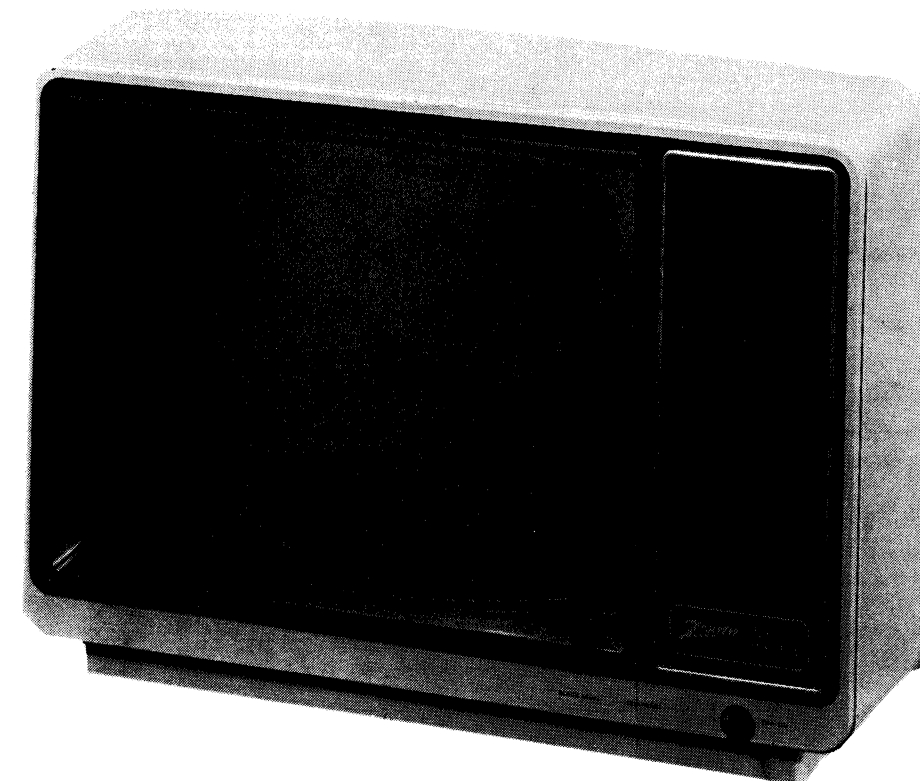
FOCUS

The focus may be varied by a focus control. (See photo, Cabinet-Rear View.)

CENTERING

Centering is accomplished by proper adjustment of two magnetic rings located on the yoke rear cover.

ZENITH
MODEL ZVM-121
CMT2-2



ZENITH
MODEL ZVM-121
CMT2-2

MODEL ZVM-121

PRELIMINARY SERVICE CHECKS

ENCLOSED

SAFETY PRECAUTIONS

See pages 4, 5.

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PRELIMINARY SERVICE CHECKS (Continued)

SERVICE CHECKS

SEE INTERCONNECTING DIAGRAM, PLACEMENT CHART, AND PHOTOS TO MATCH THE NUMBER IN THE CIRCLES WITH THOSE IN THE FOLLOWING DATA FOR SERVICE CHECKS TO BE PERFORMED.

- 1

DEAD MONITOR

(A)

Check for 120VAC between the cathode of Diode (D801 and the cathode of Diode D802. If 120VAC is missing, check the following components:

(B)

Fuse F1.

(C)

Resistor R801 (1.5 ohms)

(D)

Check for 168V (with respect to isolated ground) at the collector of Switching Transistor (Q801). If 168V is missing, check the following components:

(E)

Transformer T801

(F)

Diodes D801 thru D804

(G)

Check for 115V at the cathode of Diode D808. If 115V is missing, check the following components:

(H)

Diodes D808 and D814

(K)

Horizontal Output Transistor (Q551)
- 2

NO DISPLAY

(A)

Check for 161V at the cathode of Diode D504. If 161V is missing, check resistor R525 (1 ohm). If R525 is open, check Diode D504 for short.

(B)

Check the voltages on the CRT.

(C)

Check the CRT with a CRT tester.
- 3

NO SOUND

(A)

Connect a jumper lead between pins 1 and 3 of plug CO-A4. If sound returns, change the Earphone Jack (J9).

(B)

Check for 16.46V at the emitter of Audio Output Transistor (Q253). If the voltage is missing, check Fusible Resistor R251 (8.2 ohms), Diode D515 and Fusible Resistor R536 (1 ohm).

(C)

Check the Volume Control.
- 4

VIDEO

(A)

Check for 12.28V at the junction of Resistor R117 and Coil L401.

(B)

If 12.28V is missing, check Resistor R117.
- 5

COLOR SHADING ON DISPLAY

(A)

Check Thermistor D851 (Cold resistance 7.5 ohm) in the degaussing circuit.

(B)

Check Degaussing Coil (L900).
- 6

COLORS OFF

(A)

Check the adjustment of the APC Trimmer Capacitor (C614). See Miscellaneous Adjustments.

(B)

Check for 8.52V at pin 21 of the Video/Chroma IC (IC601) and 4.41V at pin 9 of IC601.

PRELIMINARY SERVICE CHECKS (Continued)

MISCELLANEOUS ADJUSTMENTS

NOTE: Adjustments requiring Pattern Generator. Use a 1V p-p video pattern, into 75 ohm. Connect generator to Video In terminal on monitor. Pattern types will be called out in each adjustment (color bar, crosshatch, etc.). Set Impedance Selector Switch on monitor to 75 ohm position and Video RGB Switch to Video position.

HIGH VOLTAGE CHECK

NOTE: Check B + Source for 115 V ± .50V at zero beam current. Connect a high voltage meter to the CRT HV anode. High voltage should read 23KV ± 1.5KV.

B + ADJUSTMENT

115V Adjust Control (R810) and Over Voltage Adjust Control (R541) are factory set and sealed.

ABL (SUB BRIGHTNESS) ADJUSTMENT

See NOTE and connect a color bar pattern to Video In terminal. Connect a VTVM positive lead to TPD2 and negative lead to TPD1. Set Panabrite and Color Controls to MINIMUM. Set Brightness Control to Maximum and adjust Sub Brightness Control (R313) for 7.40V. Remove meter.

SUB CONTRAST ADJUSTMENT

See NOTE and connect a color bar pattern to Video In terminal. Adjust Sub Contrast Control (R306) for desired contrast without overload.

APC ADJUSTMENT

See NOTE and connect a color bar pattern to Video In terminal. Connect a 100K ohm Resistor from TP44 to TPA46 and a .01 µF Capacitor from TP20 to TPA10. Set Color Control to Maximum and adjust APC Trimmer Capacitor (C614) until color bars stop or slowly float across the screen. Remove Resistor and Capacitor.

HORIZONTAL HOLD AND SUB HORIZONTAL HOLD ADJUSTMENT

See NOTE and connect a color bar pattern to Video In terminal. Connect a .1 µF Capacitor to TPD3, low side to ground. Set Horizontal Hold Control (R504) to midrange, adjust Sub Horizontal Hold Control (R505) until the bars sync or slowly float across the screen. Remove Capacitor.

3.58MHz TRAP ADJUSTMENT

This adjustment is made with the set turned Off. Connect a scope and signal generator across the 3.58MHz Trap (LC301). Set generator for 3.58MHz and adjust LC301 for MINIMUM indication on scope.

COLOR PURITY ADJUSTMENT

See NOTE and connect a crosshatch pattern to Video In terminal. Turn Brightness Control to Maximum. Turn Red Low Light Control (R354) and Blue Low Light Control (R355) to MINIMUM. Adjust Green Low Light Control (R353) to obtain green screen. Loosen the clamp holding deflection yoke and unlock the purity rings. Place the Purity Tabs at 12 o'clock position. Use a degaussing coil to demagnetize CRT and mounting brackets.

Move deflection yoke back against the Purity Magnet. Adjust Purity Tabs to place the green bar in the center of the screen. Move the deflection yoke forward until a uniform green raster is obtained. Adjust Purity Magnet if necessary. Tighten yoke clamp and purity rings.

COLOR TEMPERATURE ADJUSTMENT

See NOTE and connect a crosshatch pattern to Video In terminal. Color Control to MINIMUM. Move Service Switch (SW351) to Service position. Turn Red (R354), Blue (R355) and Green (R353) Low Light Controls 90 degrees from MINIMUM. Adjust Drive Controls to midrange. Turn Screen Control (R373) to MINIMUM and slowly advance control so that a horizontal line is just visible.

If Screen Control will not reduce to a very low level, adjust appropriate Low Light Control. Continue to adjust Low Light Controls for a low level white line. Set Service Switch to Normal position and adjust Blue Drive (R351) and Red Drive (R352) Controls for best black and white picture at high brightness.

CONVERGENCE ADJUSTMENT

See NOTE and connect a dot pattern to Video In terminal. Adjust 4-Pole Convergence Magnets to converge the red and blue dots at the center of the screen. Adjust 6-Pole Convergence Magnets to converge the red/blue dots over the green dots at the center of the screen.

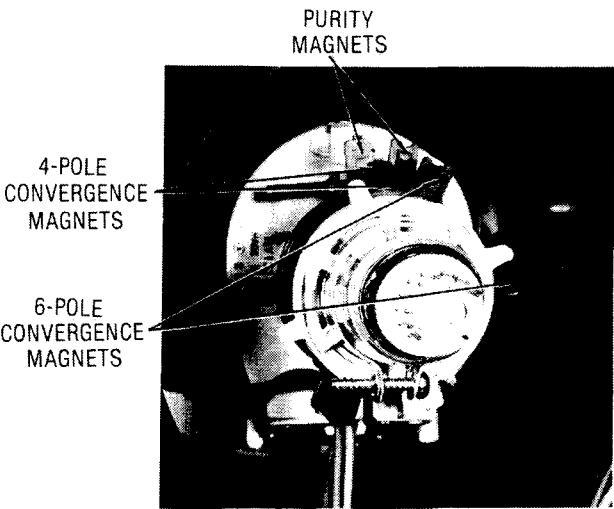
Tune in a crosshatch pattern. Remove the rubber wedges between the deflection yoke and CRT. Tilt the deflection yoke up or down to converge the vertical lines at the top and bottom of the screen and the horizontal lines at the right and left sides of the screen. Tilt the deflection yoke to the right or left to converge the horizontal lines at the top and bottom of the screen and the vertical lines at the right and left sides of the screen.

Repeat convergence procedure, if necessary, to obtain the best overall convergence. Replace the rubber wedges.

TEST EQUIPMENT AND TOOLS

TEST EQUIPMENT
Digital Volt/Ohm Meter
High Voltage Probe
CRT Tester
Color Bar Generator
Degaussing Coil

TOOLS
Phillips Screwdriver
¼" Nut Driver
Soldering Iron
Desoldering Tool



CRT NECK ASSEMBLY

PANASONIC MODEL
CT-1350MG(CH,NMX-KS-1)

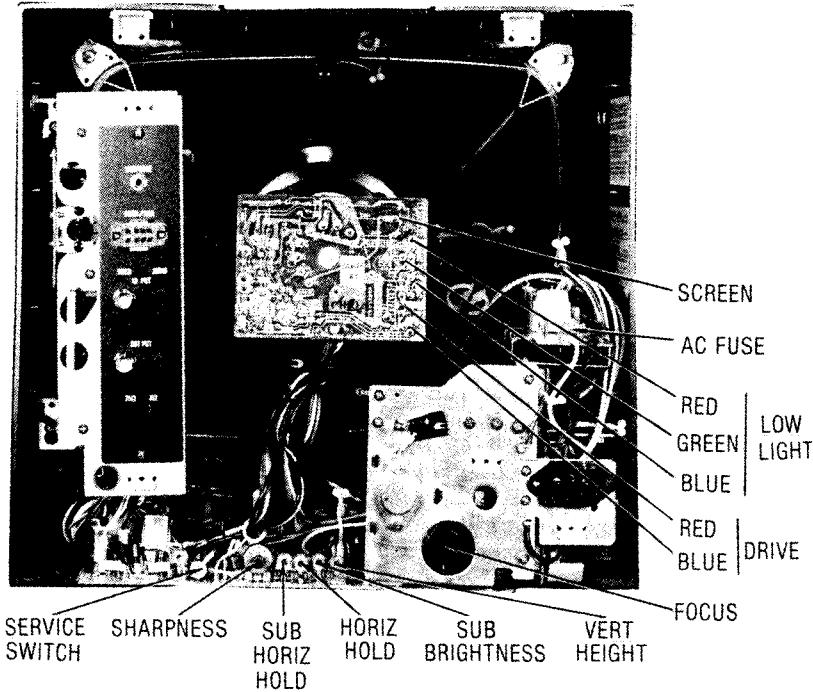
PRELIMINARY SERVICE CHECKS (Continued)
DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

Remove eight screws holding cabinet back and remove back. Disconnect HV anode, CRT socket, deflection yoke connector, degaussing coil connector, speaker connector and ground leads. Remove two screws holding Video/RGB assembly to cabinet side and remove assembly from cabinet. Lift main chassis assembly and remove assembly from cabinet. Remove three screws holding secondary control assembly to cabinet front and remove assembly from cabinet.

CRT REMOVAL

Follow "Chassis Removal" procedure and lay set facedown on a soft protective surface. Loosen and remove CRT neck assemblies, remove four screws holding CRT to cabinet front and lift CRT out of cabinet. Do not lift CRT by the neck.



CABINET—REAR VIEW

SERVICE INFORMATION

HORIZONTAL OSCILLATOR DISABLE CIRCUIT TEST

SERVICE WARNING: The test must be made as a final check before set is returned to the customer.

1. With the rear cover removed, supply a nominal 120V AC to the set and turn on the power switch.
2. Adjust the customer controls to normal operating positions.
3. Short between TP801 and TP802 on the AC Input/Voltage Adjust Board with a jumper wire.
4. Confirm that the picture tube screen blacks out (horizontal oscillation stops).

Turn the power switch off as soon as picture blacks out, otherwise D814 and C816 will be damaged.

5. If this does not occur, the horizontal oscillator disable circuit is not operating.

Follow the Repair Procedures of Horizontal Oscillator Disable Circuit before the set is returned to the customer.

Courtesy of the Manufacturer

REPAIR PROCEDURES OF HORIZONTAL OSCILLATOR DISABLE CIRCUIT

1. Connect a DC voltmeter between the cathode of D511 and chassis ground of the main circuit board.
2. If nearly +9.0V is not present at that point, find the cause by checking R519, C535 and D511, and if it is, check IC401, C507 and R509.
3. Carefully check above specified parts, and related circuits and parts.

When the circuit is repaired, try the horizontal oscillator disable circuit test again.

PRELIMINARY SERVICE CHECKS

This data provides the user with a time-saving service tool which is designed for quick isolation and repair of monitor malfunctions.

Check all interconnecting cables for good connection and correct hook-up before making service checks.

PARTS LIST AND DESCRIPTION

ITEM	PART NO.	DESCRIPTION
C507	ECEA1CS100	Electrolytic (10μF 16V)
C535	ECCF1H101K	Capacitor (100pF 50V 10%)
# C816	ECEA180V100	Electrolytic (100μF 250V)
D504	TVSRH1S	Diode
# D511	TVSHZ9C1	Zener Diode
D515	TVSRH1S	Diode
# D801	TVS0510	Diode
Thru		
D804		
# D808	TVSRU2AM	Diode
# D814	TVSSR2K	Diode
# D851	ERPF5B0M080F	Thermistor (PTC 7.5 ohms Cold)
# F1	XBAIF30NU14A	Fuse (3A @ 125V Slow-Blow)
# IC401		IC (AN5436)
J9	TJS37140	Earphone
Q551		Transistor (2SD950)
# R117	ERF5AJ680(1)	Resistor (68 ohms 5% 5W)
# R251	ERQ12HJ8R2(1)	Fusible Resistor(8.2 ohms 5% ½W)
R509		Resistor (22K 5% ¼W)
# R519	ERD25TJ224	Resistor (220K 5% ¼W)
# R525	ERD50FJ1R0P(1)	Resistor (1 ohm 5% ½W)
# R536	ERQ12HJ1R0(1)	Fusible Resistor (1 ohm 5% ½W)
# R801	ERF7AK1R5(1)	Resistor (1.5 ohms 10% 7W)
	EVAL0AC20A54	Volume Control (50K)

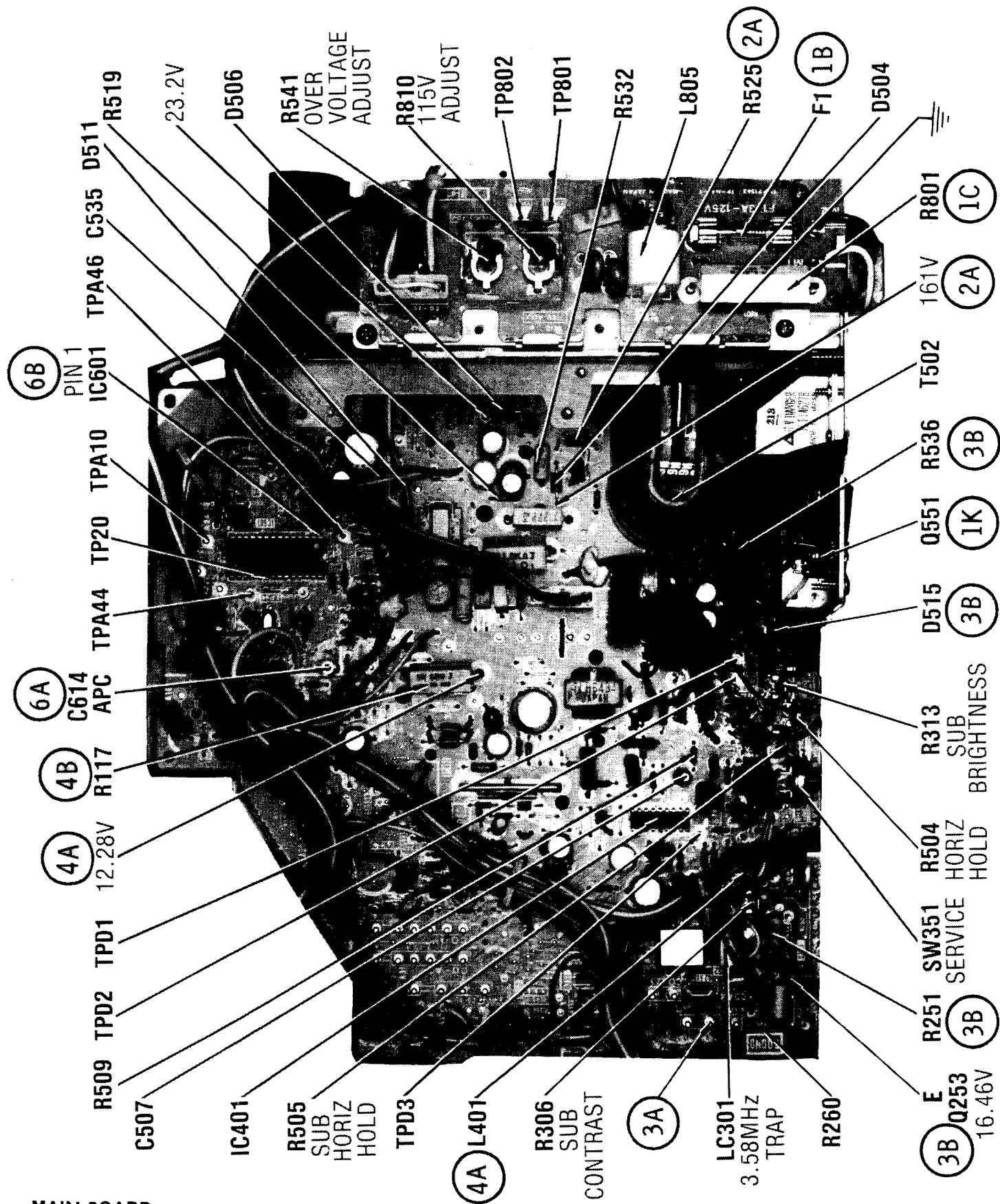
For SAFETY use only equivalent replacement part.
(1) Non Flammable

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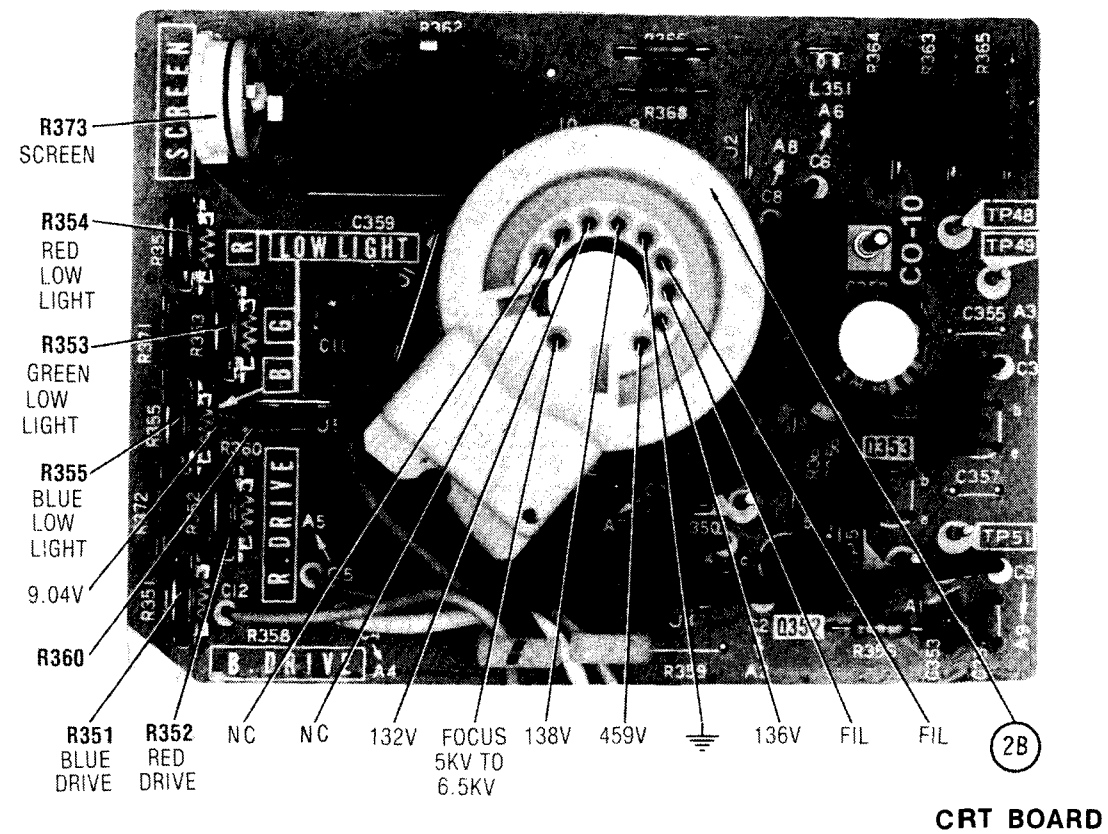
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PRELIMINARY SERVICE CHECKS (Continued)

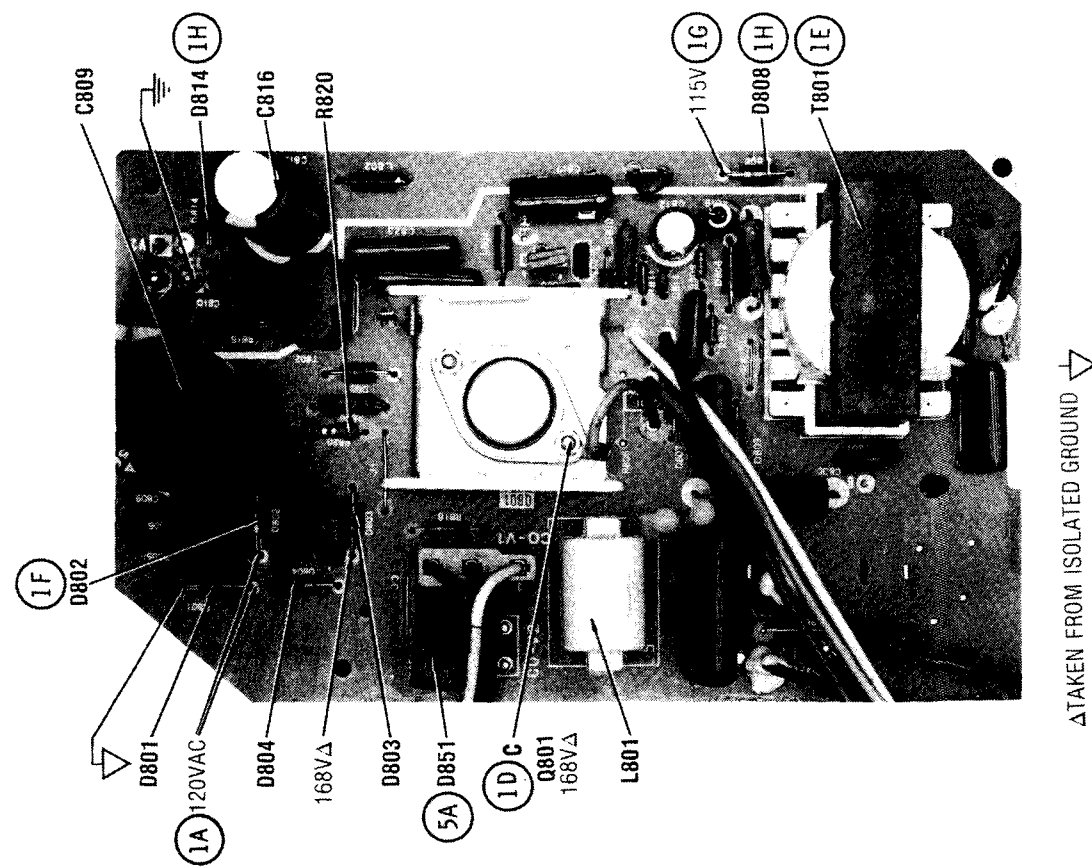


MAIN BOARD

PRELIMINARY SERVICE CHECKS (Continued)



CRT BOARD

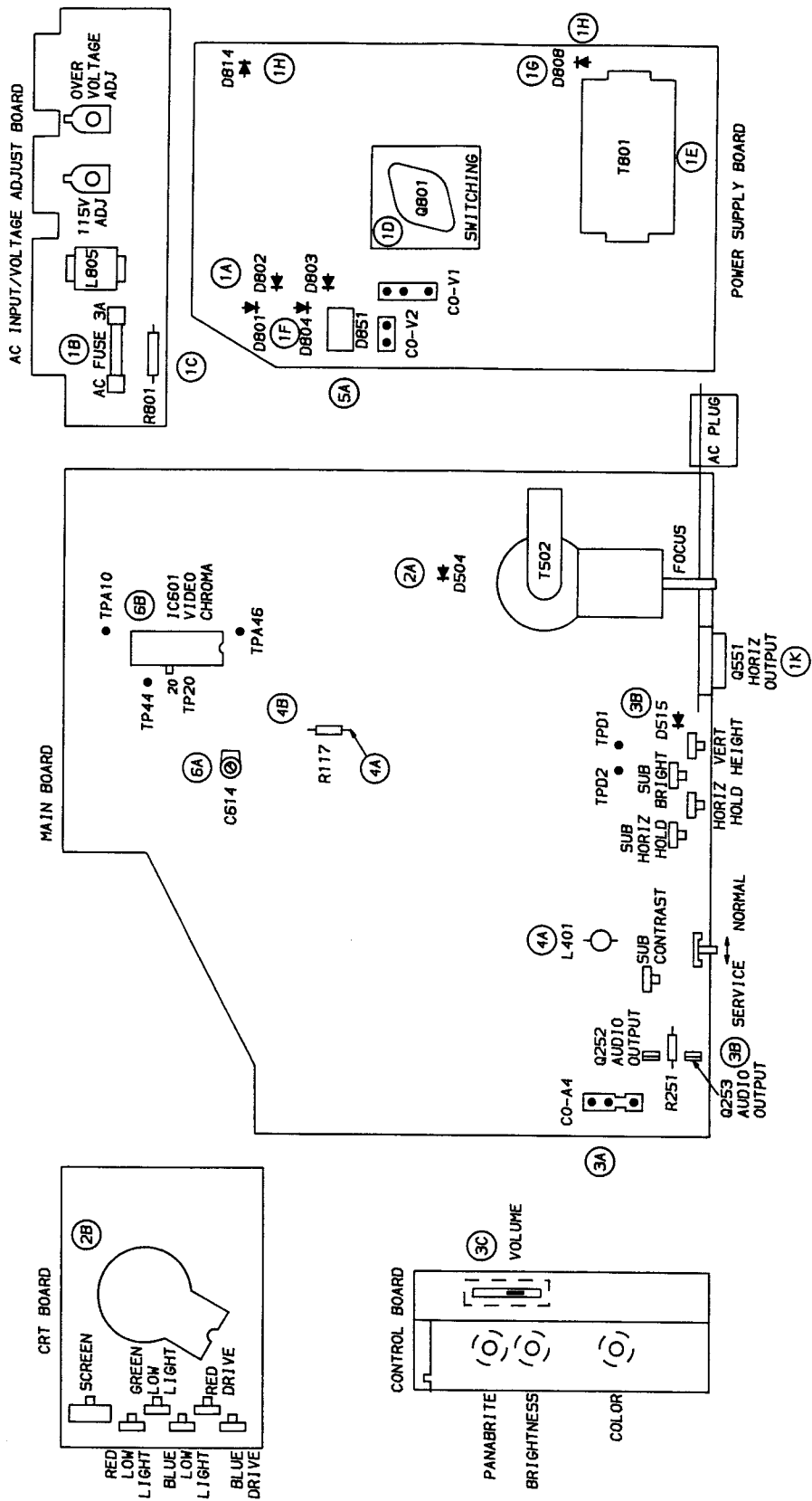


POWER SUPPLY BOARD

**PANASONIC MODEL
CT-1350MG(CH.NMX-KS-1)**

Δ TAKEN FROM ISOLATED GROUND

PRELIMINARY SERVICE CHECKS (Continued)



(Continued)

PRELIMINARY SERVICE CHECKS (Continued)

RT, AND PHOTOS TO MATCH
.LOWING DATA FOR SERVICE

.1V is missing, check Coil L504.

e voltage 103V at the cathode of Diode
l.

e voltage 265V at the cathode of Diode
s.

e voltage 24.5V at the cathode of Diode
s.

AY
: for bad connection at the Video Input
(J101).

: voltages on CRT.

: for high voltage with HV probe.

: the CRT with CRT tester.

BRIGHTNESS AND CONTRAST

Contrast Control (R203).

Black Level Control (R204).

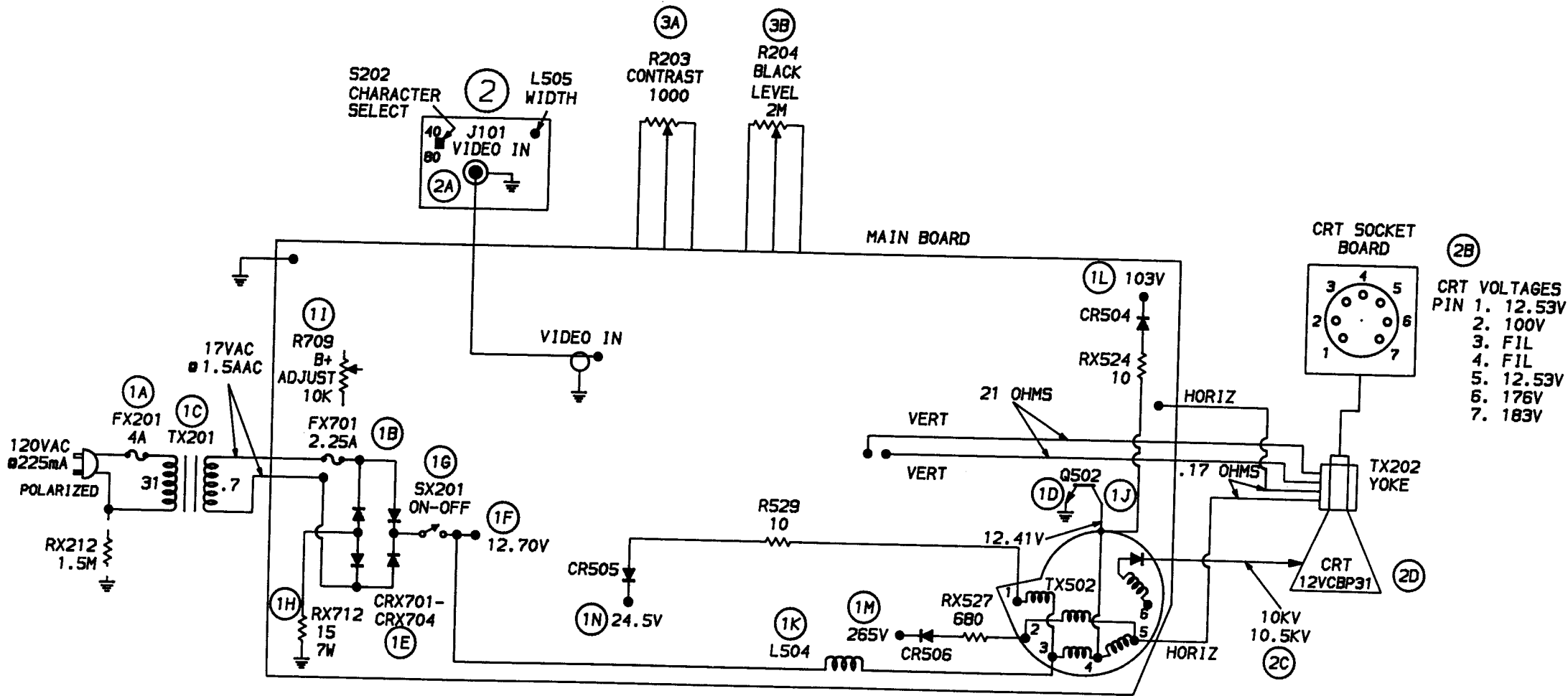
ist Control

T AND DESCRIPTION

PART NO.	DESCRIPTION
3-295-02A	DIODE
3-295-03A	DIODE
3-261-04	DIODE
3-261-04	BRIDGE RECTIFIERS

3-114-23	4A FUSE
3-120-07	2.25A FUSE
3984	RF CHOKE
3-1028-01	HORIZONTAL OUT- PUT TRANSISTOR.
10817	B + ADJUST CONTROL
10449-52	15 ohm, 7W RESISTOR
1610	ON-OFF SWITCH.

ie only equivalent replacement part.



CRT VOLTAGES
PIN 1. 12.53V
2. 100V
3. FIL
4. FIL
5. 12.53V
6. 176V
7. 183V

ZENITH
MODEL ZVM-121

INTERCONNECTING DIAGRAM

PRELIMINARY SERVICE CHECKS (Continued)

SERVICE CHECKS

SEE INTERCONNECTING DIAGRAM, PLACEMENT CHART, AND PHOTOS TO MATCH THE NUMBER IN THE CIRCLES WITH THOSE IN THE FOLLOWING DATA FOR SERVICE CHECKS TO BE PERFORMED.

- ① POWER SUPPLY

Check the following components and for the specified voltages where indicated:

 - (A) Fuse FX201
 - (B) Fuse FX701
 - (C) If FX201 is open, check Power Transformer (TX201) with an ohmmeter.
 - (D) If FX701 is open, check the Horizontal Output Transistor Q502.
 - (E) Bridge Rectifiers (CRX701 thru CRX704).
 - (F) Source voltage 12.70V at the cathodes of Bridge Rectifiers (CRX702, CRX703).
 - (G) If voltage is not correct or missing, check On-Off Switch (SX201).
 - (H) Resistor RX712 with an ohmmeter.
 - (I) B+ Adjust Control (R709).
 - (J) 12.41V at the collector of Transistor Q502.
- (K) If 12.41V is missing, check Coil L504.

(L) Source voltage 103V at the cathode of Diode CR504.

(M) Source voltage 265V at the cathode of Diode CR506.

(N) Source voltage 24.5V at the cathode of Diode CR505.
- ② NO DISPLAY
- (A) Check for bad connection at the Video Input Jack (J101).
 - (B) Check voltages on CRT.
 - (C) Check for high voltage with HV probe.
 - (D) Check the CRT with CRT tester.
- ③ POOR BRIGHTNESS AND CONTRAST
- (A) Clean Contrast Control (R203).
 - (B) Clean Black Level Control (R204).

ADJUSTMENT

B+ ADJUSTMENT

Connect a DC voltmeter to TP10. Adjust B+ Adjust Control (R709) for 12.70V.

TEST EQUIPMENT AND TOOLS

TEST EQUIPMENT

Digital Volt/Ohm Meter
High Voltage Probe
CRT Tester

TOOLS

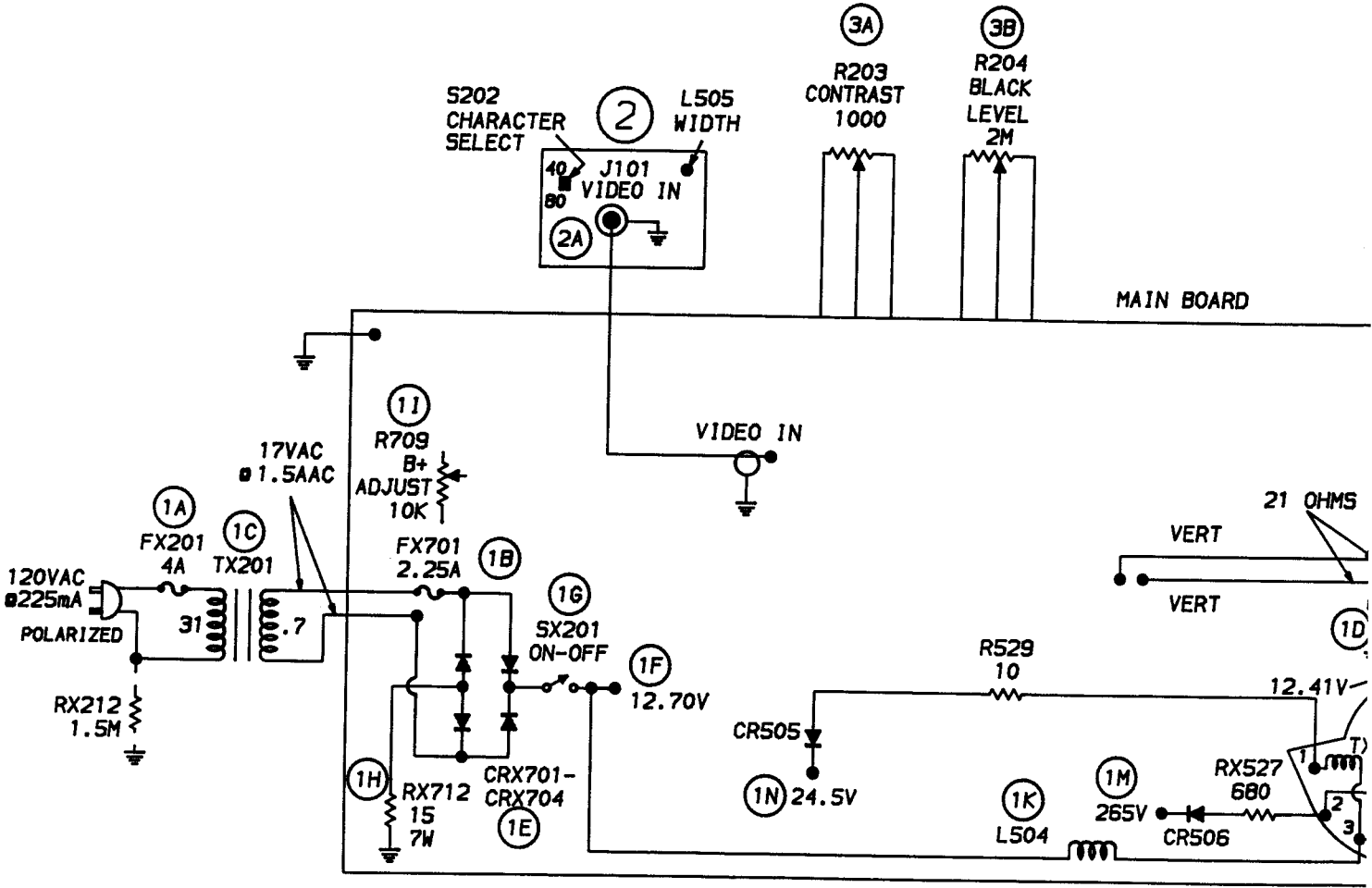
Phillips Screwdriver
1/4" Nut Driver
Soldering Iron
Desoldering Tool

PARTS LIST AND DESCRIPTION

ITEM	PART NO.	DESCRIPTION
CR504	103-295-02A	DIODE
CR505	103-295-03A	DIODE
CR506	103-261-04	DIODE
# CRX701 thru CRX704	103-261-04	BRIDGE RECTIFIERS
# FX201	136-114-23	4A FUSE
# FX701	136-120-07	2.25A FUSE
# L504	20-3984	RF CHOKE
# Q502	121-1028-01	HORIZONTAL OUTPUT TRANSISTOR.
# R709	63-10817	B+ ADJUST CONTROL
# RX712	63-10449-52	15 ohm, 7W RESISTOR
# SX201	85-1610	ON-OFF SWITCH.

For SAFETY use only equivalent replacement part.

PRELIMINARY SERVICE CHECKS (Continued)



Check all
correct hc

CHASSIS

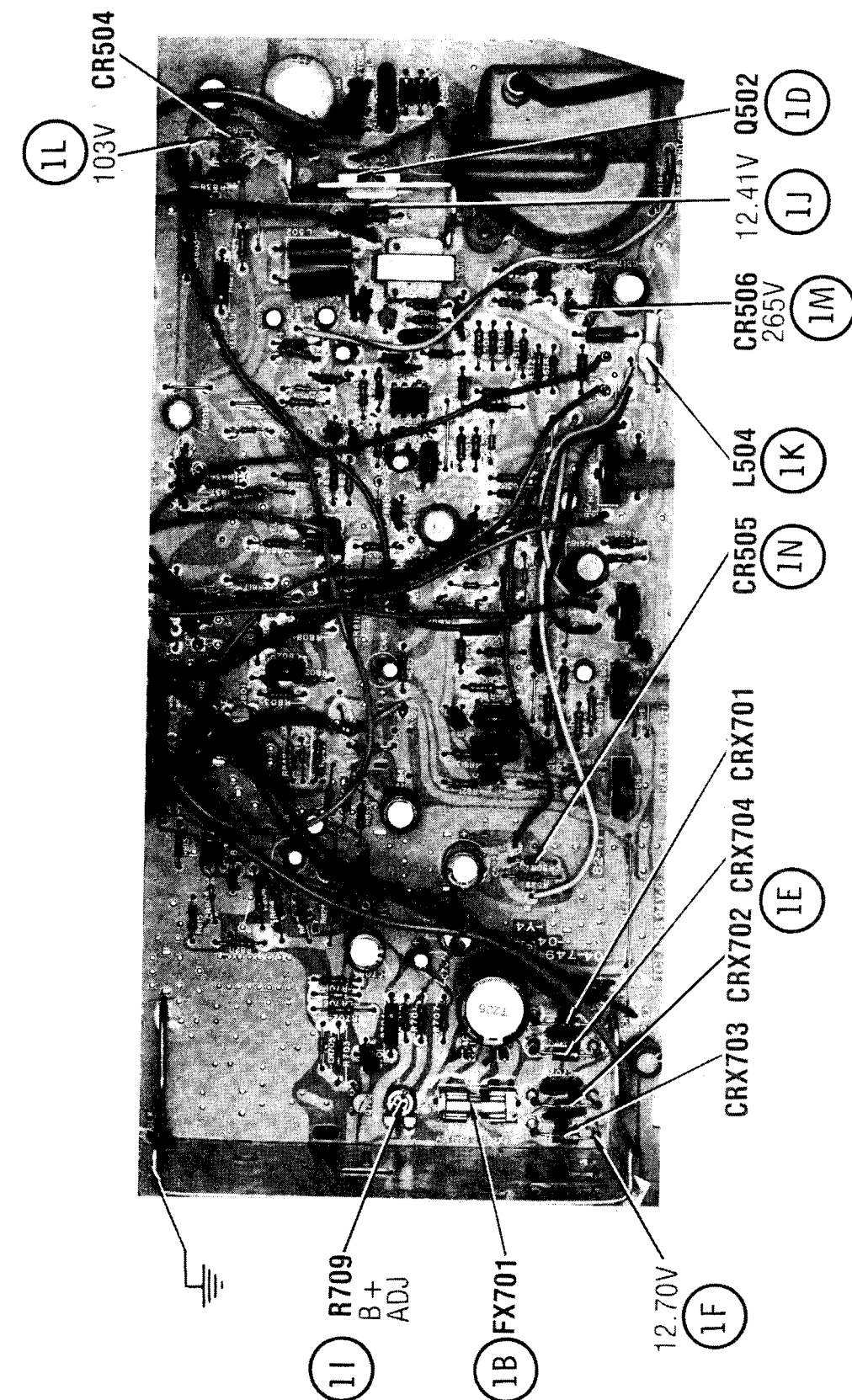
CRT REM:

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4300 West

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MAIN BOARD



PRELIMINARY SERVICE CHECKS

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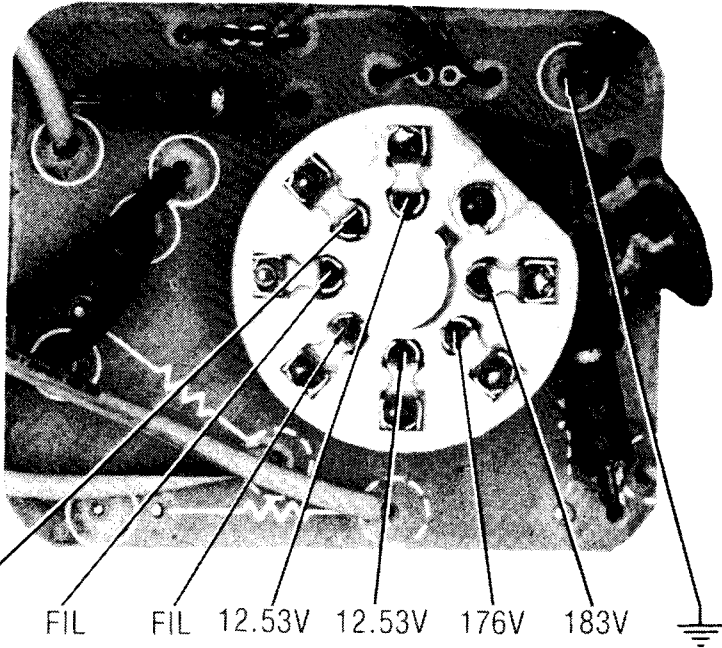
DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

Remove four screws holding cabinet back. Remove one screw holding video input block to cabinet back and remove cabinet back from set. Disconnect CRT socket, HV anode lead and ground wires. Loosen and remove deflection yoke from neck of CRT. Remove three screws holding power transformer to cabinet front. Carefully remove main PC board and assemblies from cabinet.

CRT REMOVAL

Follow "Chassis Removal" procedure. Then, place set face down on a soft protective surface. Remove four screws holding CRT to cabinet front. Lift CRT from cabinet. Do not lift CRT by the neck.

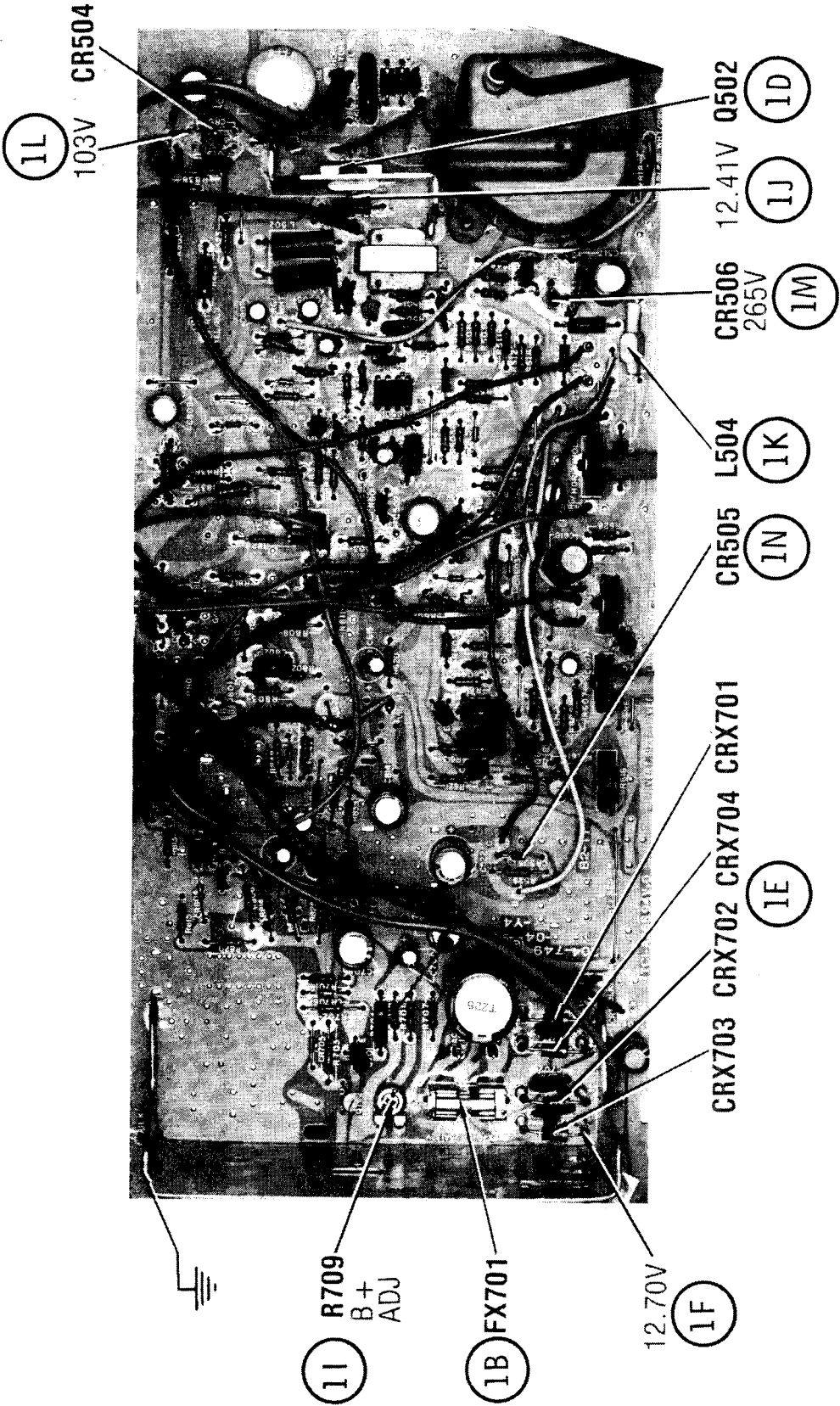


CRT SOCKET BOARD

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MAIN BOARD

CMT2-2 ZENITH
MODEL ZVM-121

CMT2-2 ZENITH
MODEL ZVM-121

SAFETY PRECAUTIONS

IMPORTANT SAFETY NOTICE

There are special components used in Panasonic Monitor sets which are important for safety. These parts are shaded on the schematic diagram and on the replacement parts list. It is essential that these critical parts should be replaced with manufacturer's specified parts to prevent X-RADIATION, shock, fire, or other hazards. Do not modify the original design without permission of Matsushita Electric.

GENERAL GUIDELINES

1. It is advisable to insert an isolation transformer in the AC supply before servicing a hot chassis.
2. When servicing, observe the original lead dress, especially the lead dress in the high voltage circuits. If a short circuit is found, replace all parts which have been overheated or damaged by the short circuit.
3. After servicing, see to it that all the protective devices such as insulation barriers, insulation papers, shields, and isolation R-C combinations, are properly installed.
4. Before turning the receiver on, measure the resistance between B+ line and chassis ground. Connect - side of an ohmmeter to the B+ lines, and + side to chassis ground. Each line should have more resistance than specified, as follows.

B + Line	Minimum Resistance
115V	100k Ω
24V	280 Ω
12V	280 Ω

5. When the TV set is not used for a long period of time, unplug the power cord from the AC outlet.
6. Potentials, as high as 25.0 kV are present when this monitor is in operation. Operation of the monitor without the rear cover involves the danger of a shock hazard from the monitor power supply. Servicing should not be attempted by anyone who is not thoroughly familiar with the precautions necessary when working on high-voltage equipment. Always discharge the anode of the picture tube to the receiver chassis before handling the tube.
7. After servicing make the following leakage current checks to prevent the customer from being exposed to shock hazards.

X-RADIATION

WARNING: 1. The potential source of X-Radiation in TV sets is the High Voltage section and the picture tube.

2. When using a picture tube test jig for service, ensure that jig is capable of handling 25.0 kV without causing X-Radiation.

NOTE: It is important to use an accurate periodically calibrated high voltage meter.

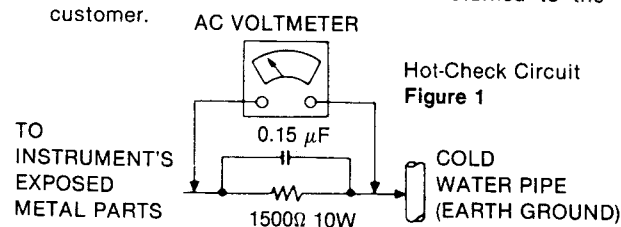
1. Turn the Brightness control fully counterclockwise.
2. Set the SERVICE switch to SERVICE.

3. Measure the High Voltage. The meter reading should indicate 23.5kV $\pm$ 1.5kV. If the meter indication is out of tolerance, immediate service and correction is required to prevent the possibility of premature component failure.

4. To prevent an X-Radiation possibility, it is essential to use the specified picture tube.

LEAKAGE CURRENT HOT CHECK (See figure 1.)

1. Plug the AC cord directly into the AC outlet. Do not use an isolation transformer for this check.
2. Connect a 1.5 k Ω , 10 watts resistor, in parallel with a 0.15 μ F capacitor, between each exposed metallic part on the set and a good earth ground such as a water pipe, as shown in figure 1.
3. Use an AC voltmeter, with 1000 ohms/volt or more sensitivity, to measure the potential across the resistor.
4. Check each exposed metallic part, and measure the voltage at each point.
5. Reverse the AC plug in the AC outlet and repeat each of the above measurements.
6. The potential at any point should not exceed 0.75 volts RMS. A leakage current tester (Simpson Model 229 equivalent) may be used to make the hot checks, leakage current must not exceed 1/2 milliamp. In case a measurement is outside of the limits specified, there is a possibility of a shock hazard, and the receiver should be repaired and rechecked before it is returned to the customer.

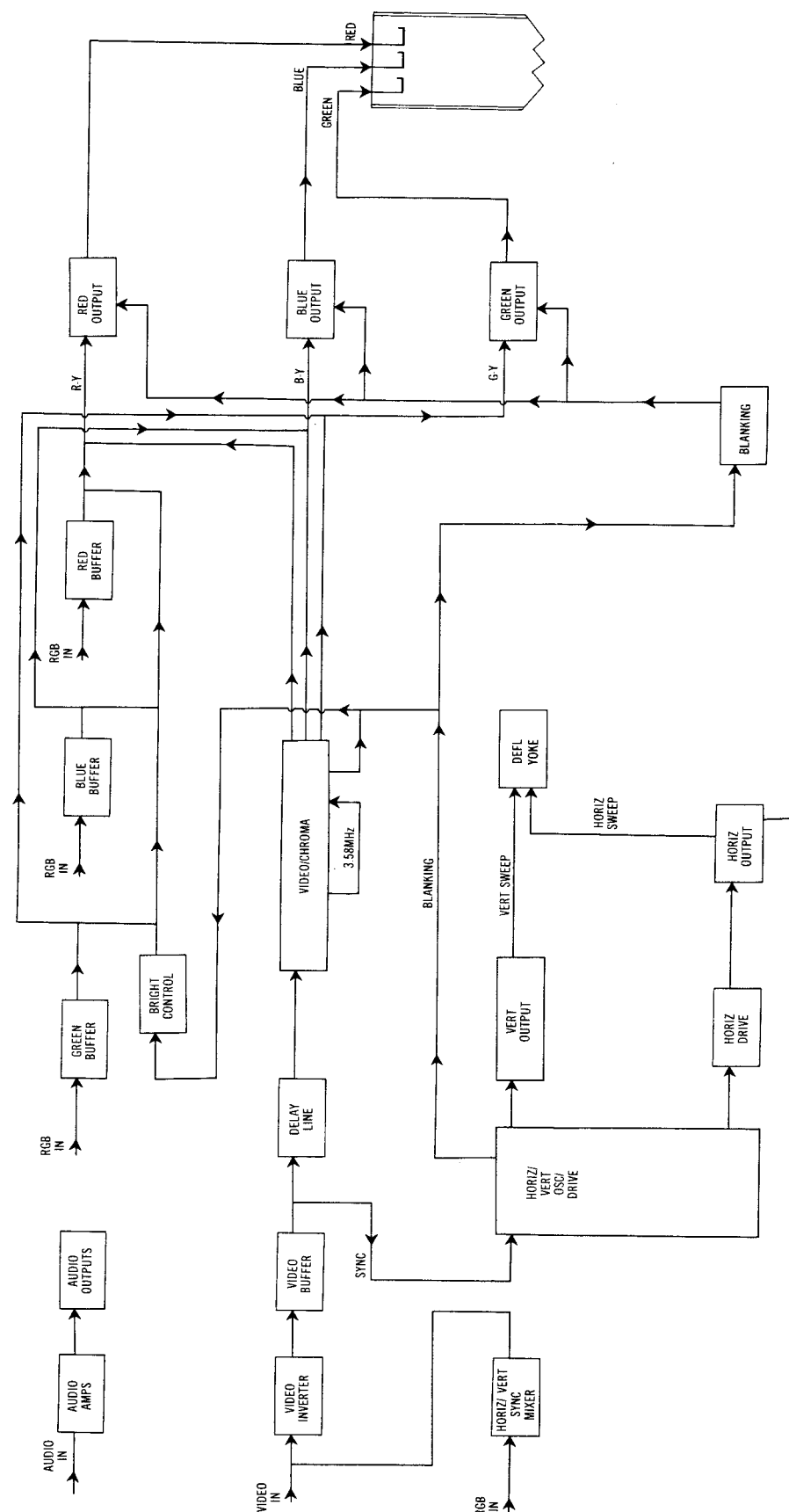


LEAKAGE CURRENT COLD CHECK

1. Unplug the AC cord and connect a jumper between the two prongs on the plug.
2. Turn on the receiver's power switch.
3. Measure the resistance value, with an ohmmeter, between the jumpered AC plug and each exposed metallic cabinet part on the receiver, such as scwheads, connectors, control shafts, etc. When the exposed metallic part has a return path to the chassis, the reading should be between 240 k Ω and 5.2 M Ω .

When the exposed metal does not have a return path to the chassis, the reading must be ∞ .

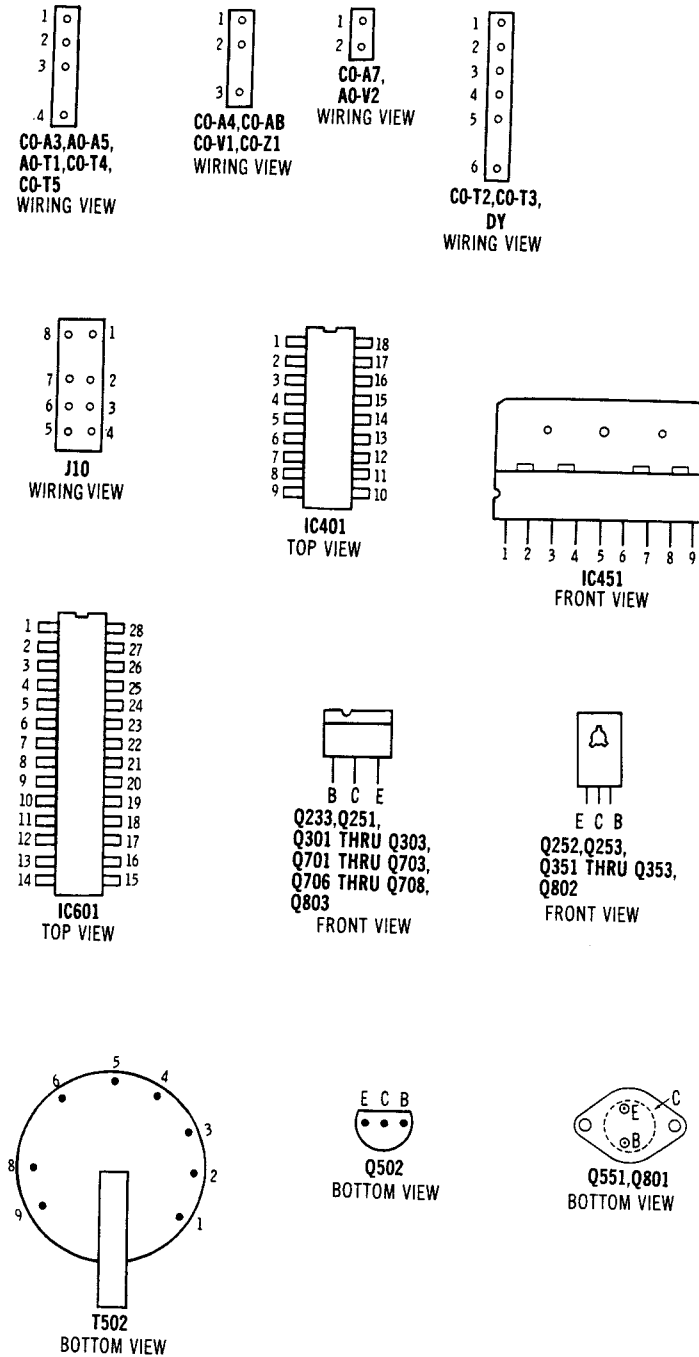
Courtesy of the Manufacturer



PANASONIC MODEL
CT-1350MG(CH.NMX-KS-1)

BLOCK DIAGRAM

TERMINAL GUIDES & SCHEMATIC NOTES



SCHEMATIC NOTES

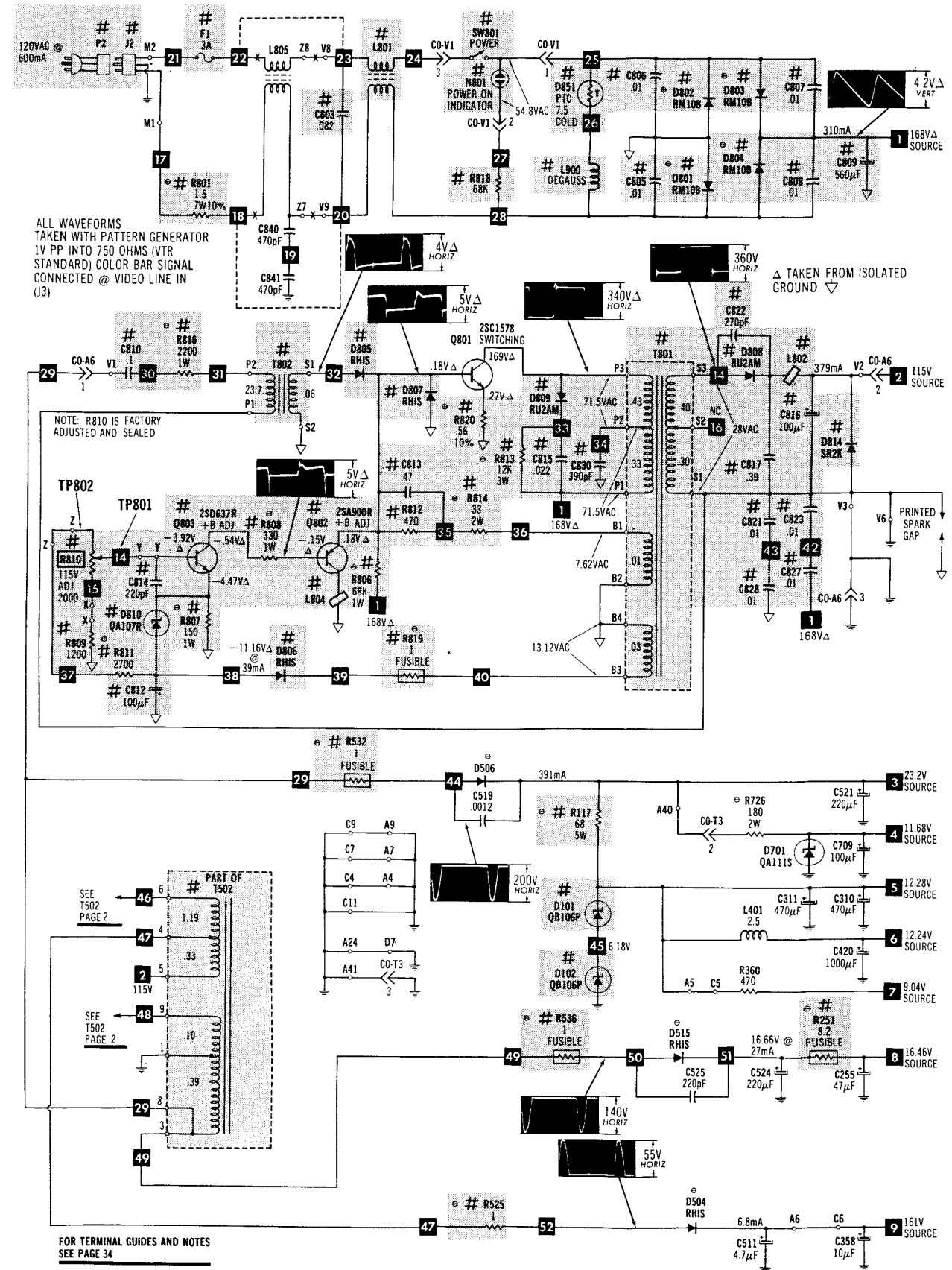
- # For SAFETY use only equivalent replacement part, see parts list.
 - Circuitry not used in some versions
 - Circuitry used in some versions
 - ⊕ See parts list
 - ⊕ Ground
 - ▽ Common tie point
- Waveforms and voltages are taken from ground, unless noted otherwise.

Waveforms: triggered scope, keyed rainbow generator. Item numbers in rectangles appear in the alignment/ad-justment instructions.

Supply voltages maintained as shown at input. Voltages measured with digital meter, no signal. Controls adjusted for normal operation. Terminal identification may not be found on unit.

Resistors are 1/2W or less, 5% unless noted. Value in () used in some versions.

Measurements with switching as shown, unless noted.



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POWER SUPPLY

MISCELLANEOUS ADJUSTMENTS

NOTE: Adjustments requiring Pattern Generator. Use a 1V p-p video pattern, into 75 ohm. Connect generator to Video In terminal on monitor. Pattern types will be called out in each adjustment (color bar, crosshatch, etc.). Set Impedance Selector Switch on monitor to 75 ohm position and Video RGB Switch to Video position.

HIGH VOLTAGE CHECK

NOTE: Check B + Source for 115 V $\pm$.50V at zero beam current. Connect a high voltage meter to the CRT HV anode. High voltage should read 23KV $\pm$ 1.5KV.

B + ADJUSTMENT

115V Adjust Control (R810) and Over Voltage Adjust Control (R541) are factory set and sealed.

ABL (SUB BRIGHTNESS) ADJUSTMENT

See NOTE and connect a color bar pattern to Video In terminal. Connect a VTVM positive lead to TPD2 and negative lead to TPD1. Set Panabrite and Color Controls to MINIMUM. Set Brightness Control to Maximum and adjust Sub Brightness Control (R313) for 7.40V. Remove meter.

SUB CONTRAST ADJUSTMENT

See NOTE and connect a color bar pattern to Video In terminal. Adjust Sub Contrast Control (R306) for desired contrast without overload.

APC ADJUSTMENT

See NOTE and connect a color bar pattern to Video In terminal. Connect a 100K ohm Resistor from TP44 to TPA46 and a .01 μ F Capacitor from TP20 to TPA10. Set Color Control to Maximum and adjust APC Trimmer Capacitor (C614) until color bars stop or slowly float across the screen. Remove Resistor and Capacitor.

HORIZONTAL HOLD AND SUB HORIZONTAL HOLD ADJUSTMENT

See NOTE and connect a color bar pattern to Video In terminal. Connect a .1 μ F Capacitor to TPD3, low side to ground. Set Horizontal Hold Control (R504) to midrange, adjust Sub Horizontal Hold Control (R505) until the bars sync or slowly float across the screen. Remove Capacitor.

3.58MHz TRAP ADJUSTMENT

This adjustment is made with the set turned Off. Connect a scope and signal generator across the 3.58MHz Trap (LC301). Set generator for 3.58MHz and adjust LC301 for MINIMUM indication on scope.

COLOR PURITY ADJUSTMENT

See NOTE and connect a crosshatch pattern to Video In terminal. Turn Brightness Control to Maximum. Turn Red Low Light Control (R354) and Blue Low Light Control (R355) to MINIMUM. Adjust Green Low Light Control (R353) to obtain green screen. Loosen the clamp holding deflection yoke and unlock the purity rings. Place the Purity Tabs at 12 o'clock position. Use a degaussing coil to demagnetize CRT and mounting brackets.

Move deflection yoke back against the Purity Magnet. Adjust Purity Tabs to place the green bar in the center of the screen. Move the deflection yoke forward until a uniform green raster is obtained. Adjust Purity Magnet if necessary. Tighten yoke clamp and purity rings.

COLOR TEMPERATURE ADJUSTMENT

See NOTE and connect a crosshatch pattern to Video In terminal. Color Control to MINIMUM. Move Service Switch (SW351) to Service position. Turn Red (R354), Blue (R355) and Green (R353) Low Light Controls 90 degrees from MINIMUM. Adjust Drive Controls to midrange. Turn Screen Control (R373) to MINIMUM and slowly advance control so that a horizontal line is just visible.

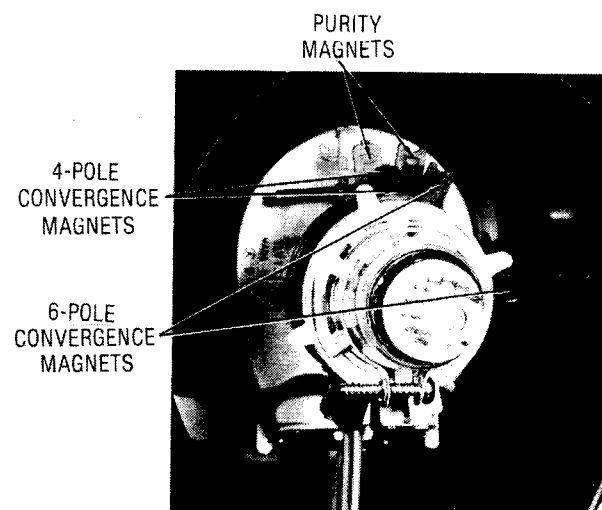
If Screen Control will not reduce to a very low level, adjust appropriate Low Light Control. Continue to adjust Low Light Controls for a low level white line. Set Service Switch to Normal position and adjust Blue Drive (R351) and Red Drive (R352) Controls for best black and white picture at high brightness.

CONVERGENCE ADJUSTMENT

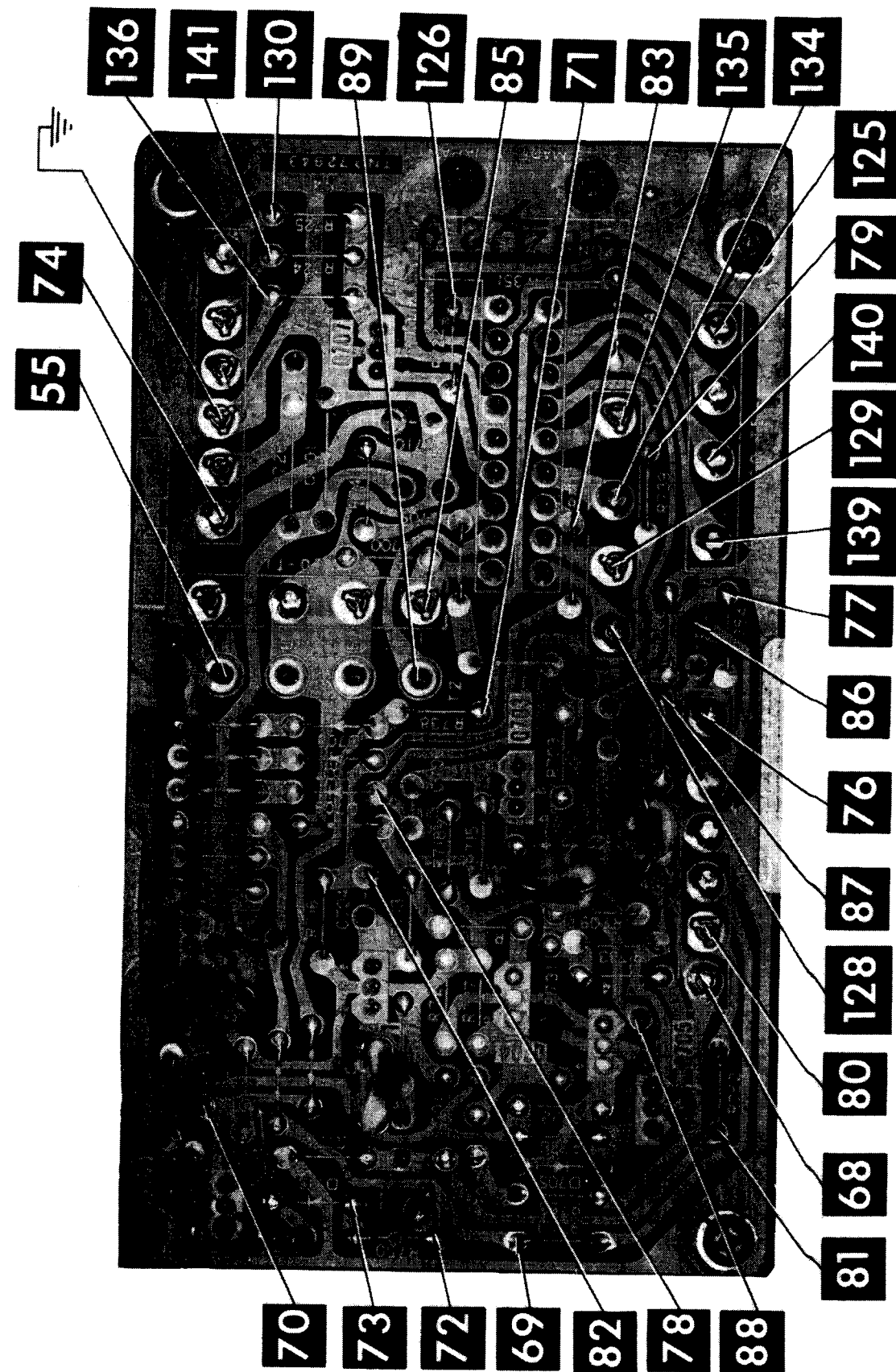
See NOTE and connect a dot pattern to Video In terminal. Adjust 4-Pole Convergence Magnets to converge the red and blue dots at the center of the screen. Adjust 6-Pole Convergence Magnets to converge the red/blue dots over the green dots at the center of the screen.

Tune in a crosshatch pattern. Remove the rubber wedges between the deflection yoke and CRT. Tilt the deflection yoke up or down to converge the vertical lines at the top and bottom of the screen and the horizontal lines at the right and left sides of the screen. Tilt the deflection yoke to the right or left to converge the horizontal lines at the top and bottom of the screen and the vertical lines at the right and left sides of the screen.

Repeat convergence procedure, if necessary, to obtain the best overall convergence. Replace the rubber wedges.



CRT NECK ASSEMBLY



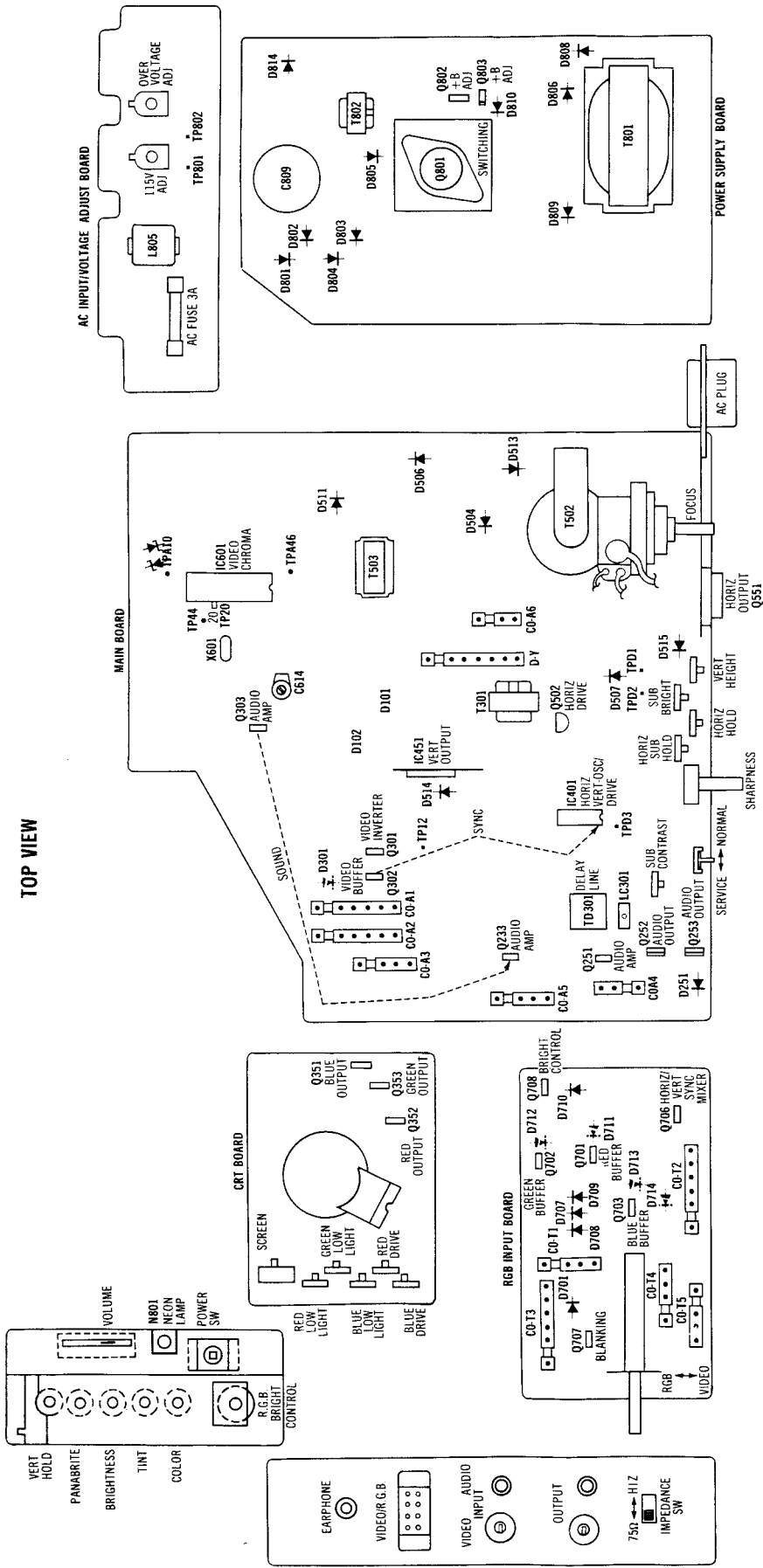
A Howard W. Sams CIRCUITRACE® Photo

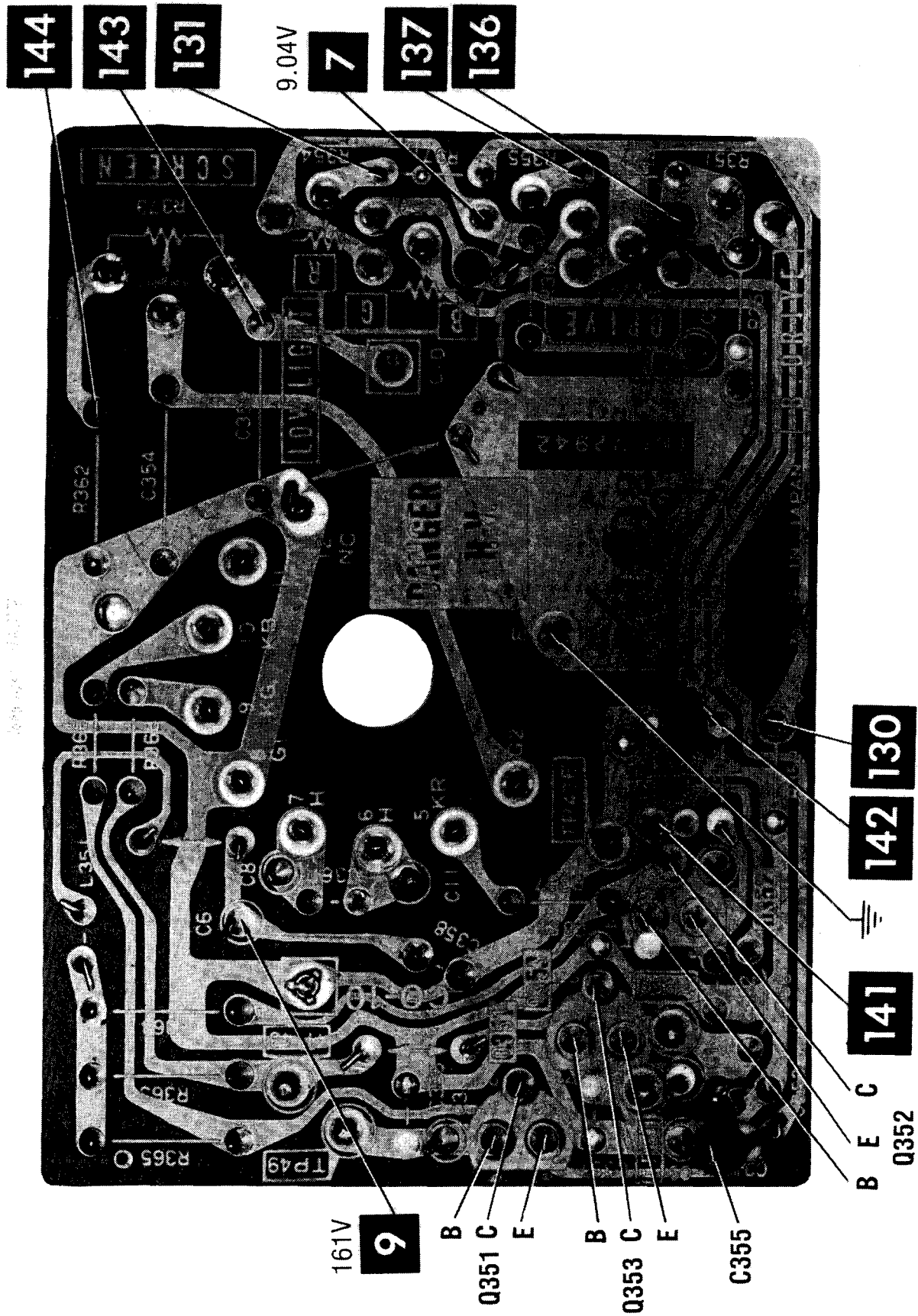
RGB INPUT BOARD

PANASONIC MODEL
CT-1350MG(CH,NMX,KS-1)

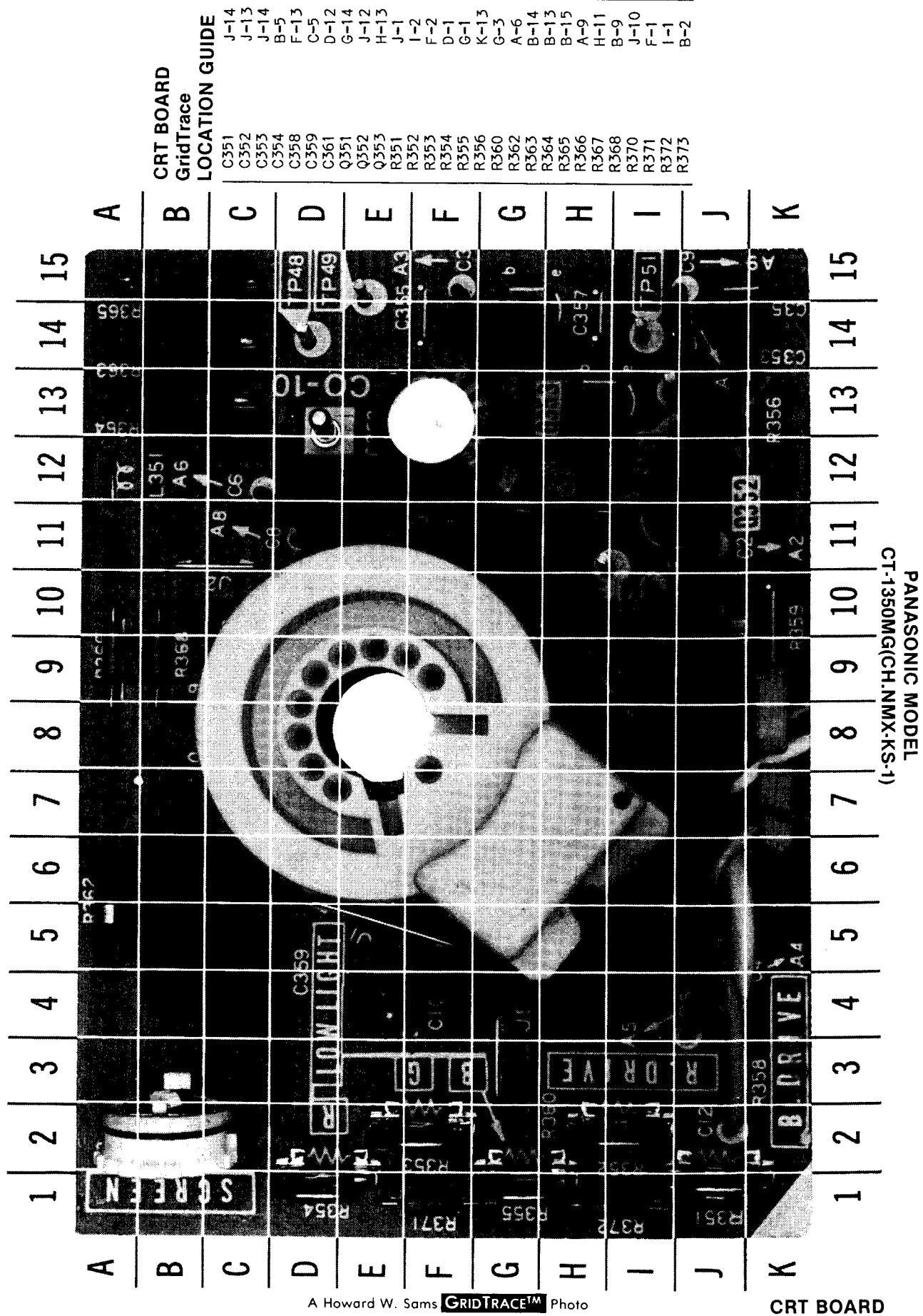
RESISTANCE MEASUREMENTS

MEASUREMENTS BELOW TAKEN WITH METER HAVING .08V MAX BETWEEN PROBE TIPS														
ITEM	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7	PIN 8	PIN 9	PIN 10	PIN 11	PIN 12	PIN 13	PIN 14
IC401	INF	21K	3200	INF	15K	1004	123K	9750	0	6790	INF	4630	9900	3830
											PIN 16	PIN 17	PIN 18	PIN 19
											636	4080	19K	37K
IC451	0	30K	INF	38K	INF	10K	4630	INF	710					
IC601	639	17K	7690	3110	14K	INF	6070	4450	5100	725	6240	INF	5460	0
	PIN 15	PIN 16	PIN 17	PIN 18	PIN 19	PIN 20	PIN 21	PIN 22	PIN 23	PIN 24	PIN 25	PIN 26	PIN 27	PIN 28
	224K	INF	INF	2.2M	INF	2720	INF	INF	INF	57K	INF	2610	2590	2570
V1	60M	NC	NC	5.5M	INF	FIL	FIL	0	INF	INF	NC	0		
ITEM	E	B	C		ITEM	E	B	C		ITEM	E	B	C	
Q233	680	12K	1480		Q351	2160	48K	INF		Q703	677	35K	828	
Q251	126	18K	INF		Q352	2120	48K	INF		Q706	394	35K	1510	
Q252	82K	INF	0		Q353	2200	48K	INF		Q707	2000	1.2M	0	
Q253	82K	INF	INF		Q502	0	679	111K		Q708	915	1243	23K	
Q301	394	7980	2160		Q551	0	.15	111K		Q801	.60	504	71K	
Q302	471	2160	733		Q701	675	35K	828		Q802	502	INF	0	
Q303	185	7970	1060		Q702	675	35K	828		Q803	150	2220	INF	

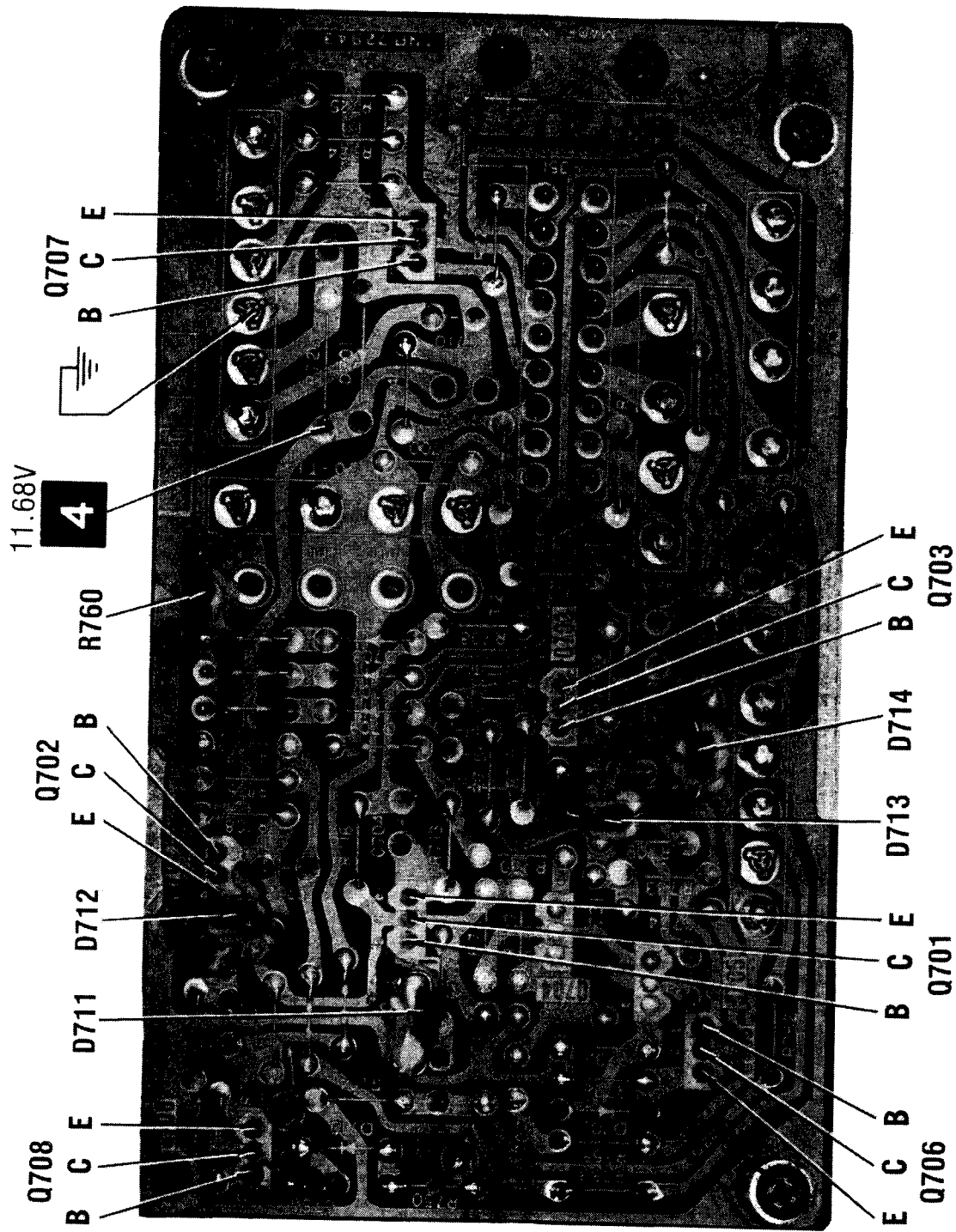




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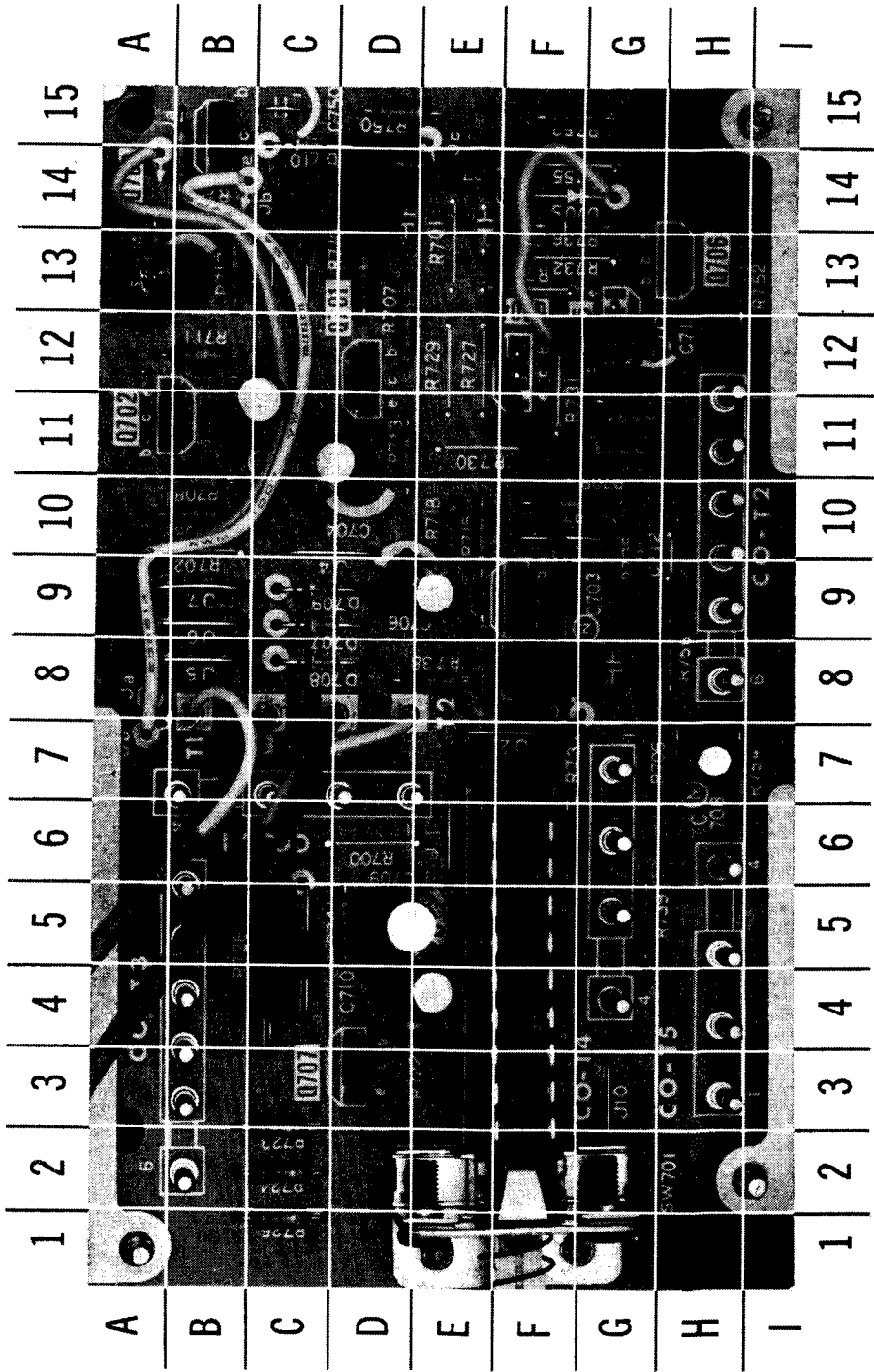


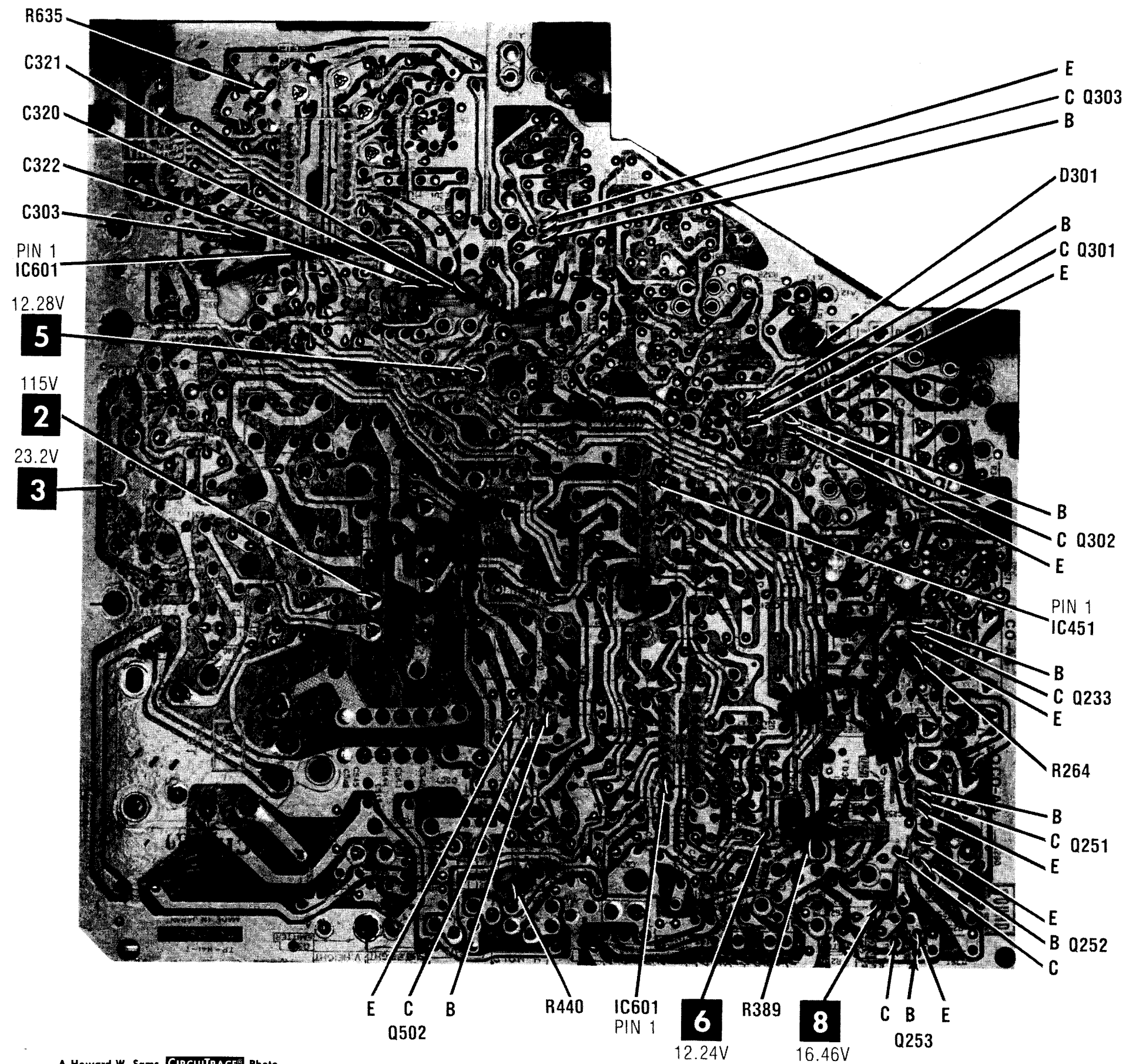
A Howard W. Sams GRIDTRACE™ Photo



RGB INPUT BOARD GridTrace LOCATION GUIDE

C701	D-14	C0-T2	H-12	Q703	F-9	R711	B-12	C-1	R751	B-14
C702	C-11	C0-T3	B-5	Q706	H-13	R712	F-10	C-5	R752	H-13
C703	F-8	C0-T4	G-7	Q707	D-3	R713	D-11	G-11	R753	F-15
C704	D-11	C0-T5	H-3	Q708	B-15	R714	A-13	G-10	R754	H-7
C705	A-13	D701	C-5	R704	C-14	R715	E-10	G-14	R756	H-8
C706	E-9	D707	C-9	R705	H-7	R716	C-11	F-14	SW701	
C708	I-7	D708	C-8	R706	B-10	R717	B-13	F-6		
C709	D-5	D709	C-9	R707	D-12	R718	E-10	E-8		
C710	E-4	D710	C-15	R708	B-10	R722	C-2	G-5		
C711	G-12	Q701	D-12	R709	G-11	R723	C-2	D-5		
C0-T1	E-7	Q702	A-11	R710	D-13	R724	C-2	D-15		





PANASONIC MODEL
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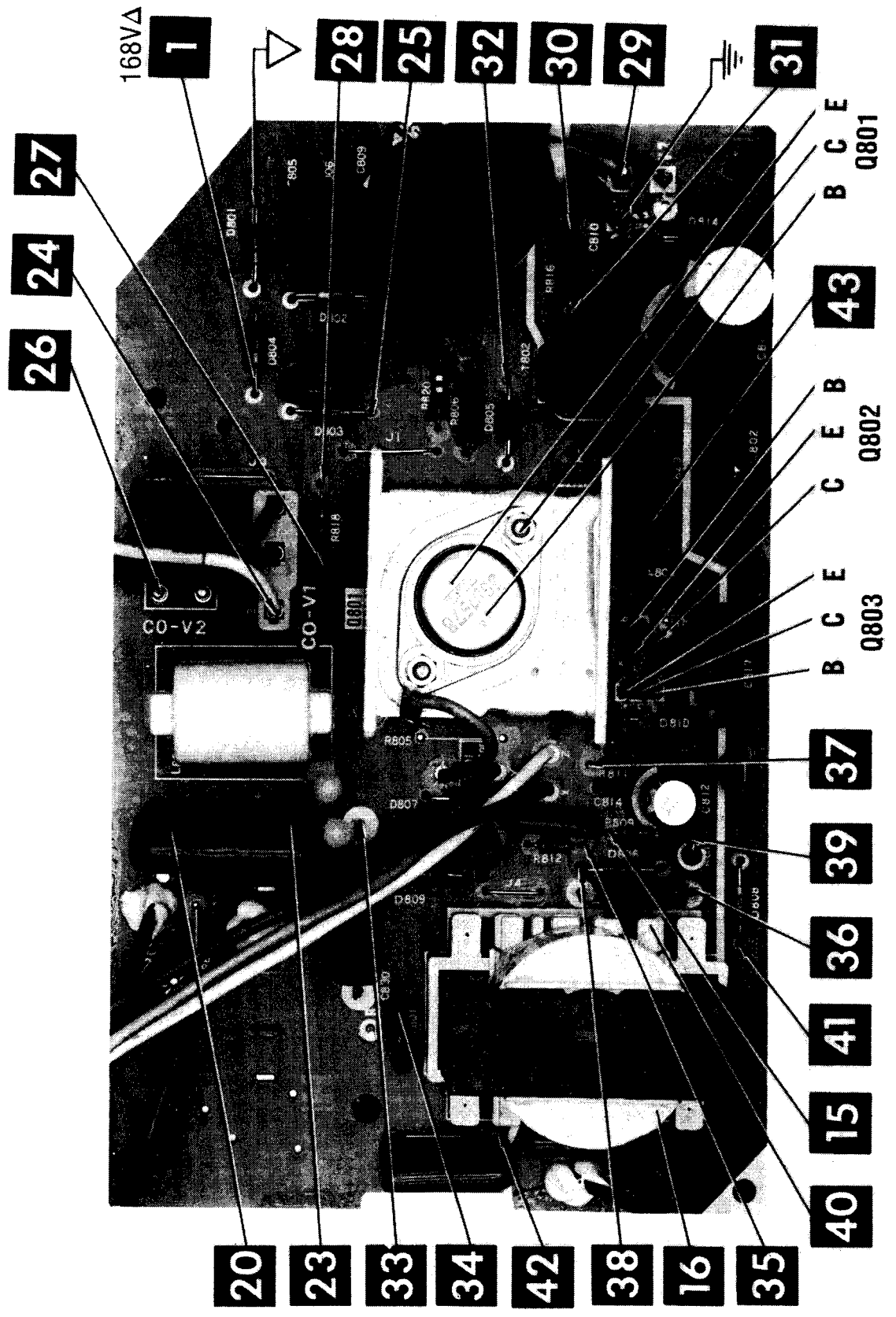
MAIN BOARD

10

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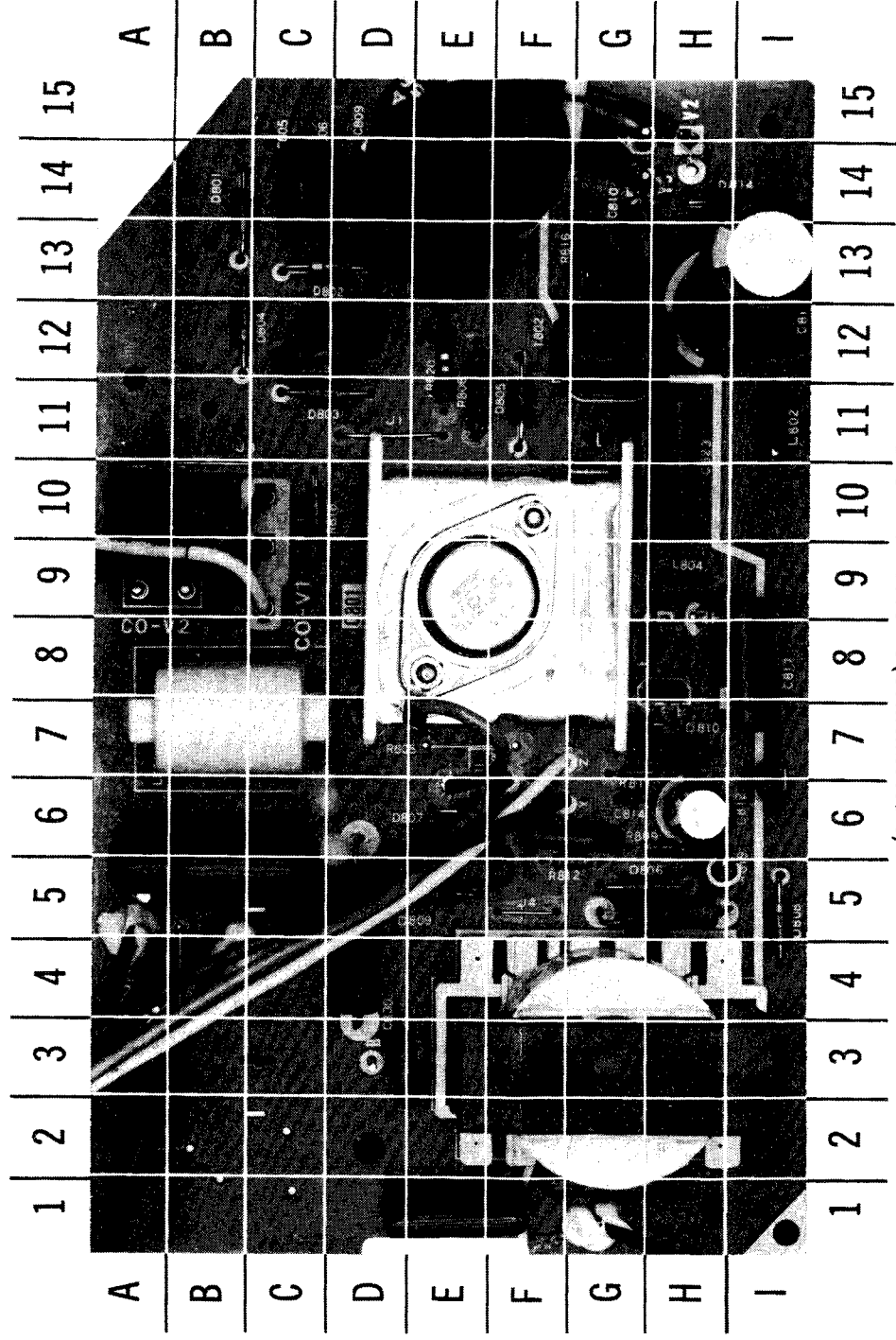
MAIN BOARD

27

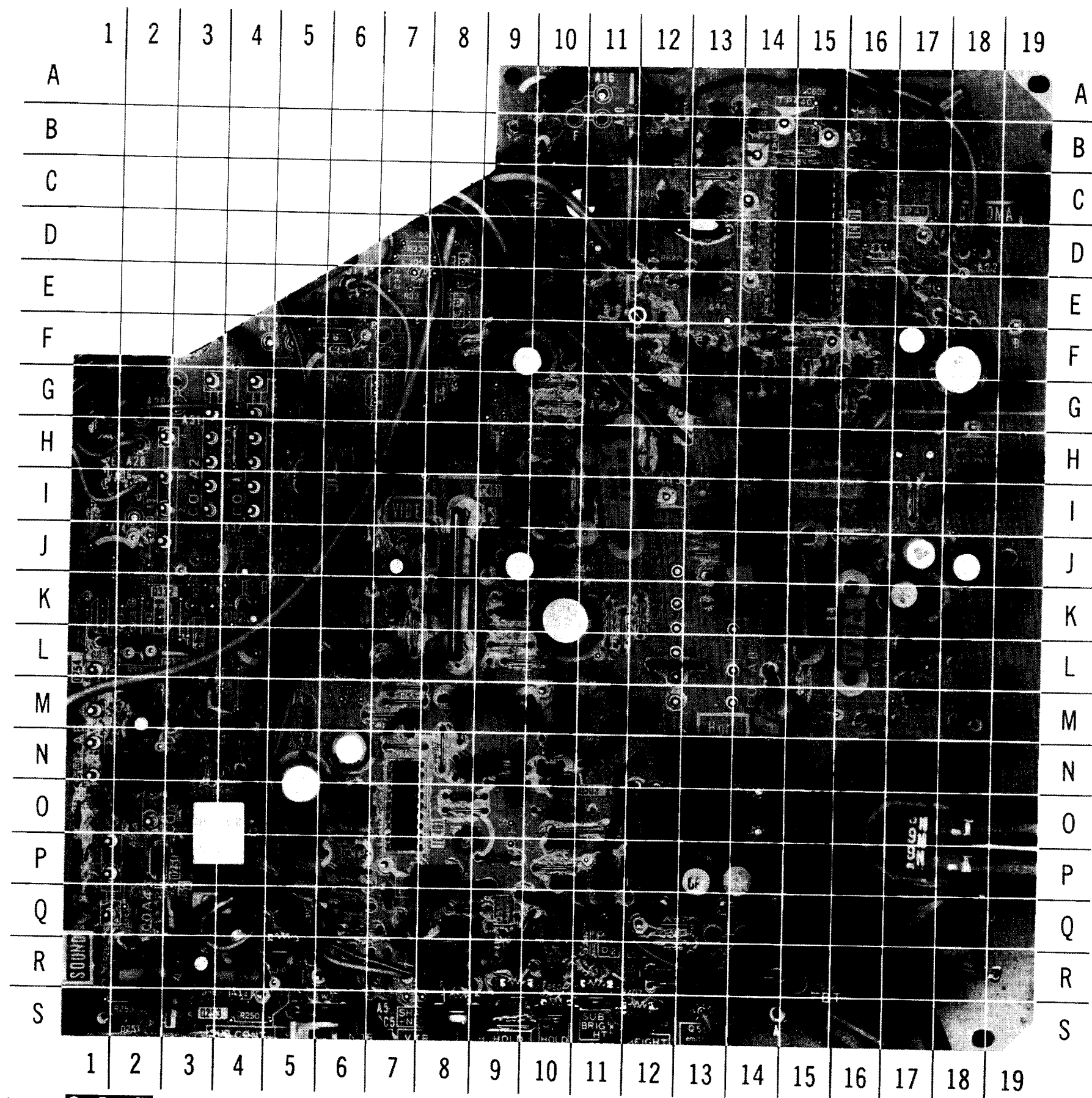


POWER SUPPLY BOARD GridTrace LOCATION GUIDE

C803	B-5	C814	G-6	D-3	D807	E-6	Q801	E-9	R813	D-4
C805	C-14	C815	E-5	C-10	D808	I-5	Q802	H-8	R814	H-5
C806	C-14	C816	I-13	A-9	D809	E-5	Q803	H-8	R816	G-13
C807	D-12	C817	I-8	B-14	D810	G-7	R806	E-11	R818	C-10
C808	C-12	C821	G-1	C-13	D814	H-14	R807	H-7	R819	H-5
C809	E-14	C822	I-7	C-11	D851	A-10	R808	G-8	R820	E-12
C810	G-13	C823	H-11	B-12	L801	B-7	R809	H-6	T801	G-3
C812	H-6	C827	G-10	S-2	L802	I-11	R811	G-7	T802	G-12
C813	G-6	C828	E-1	G-5	L804	H-9	R812			

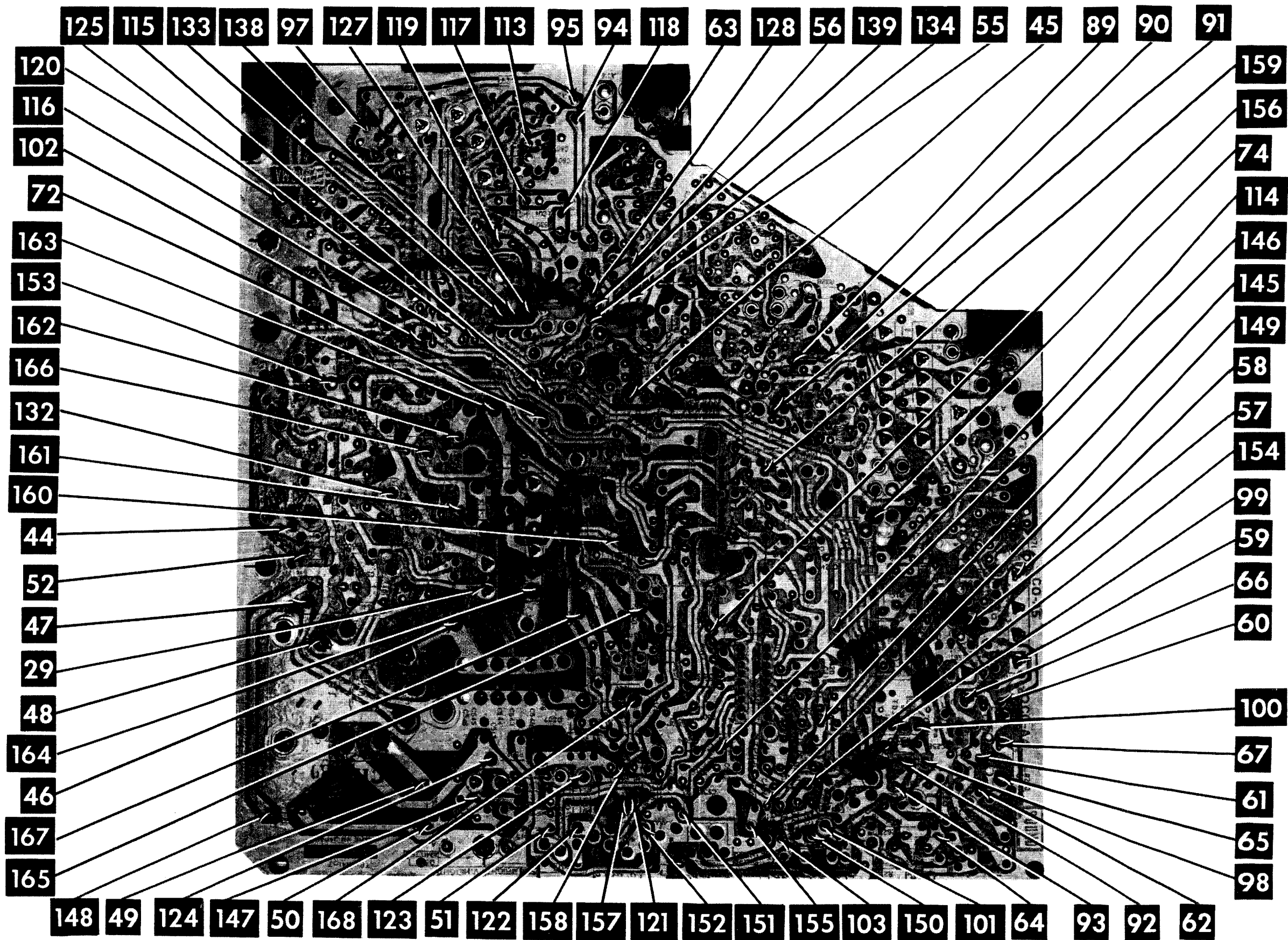


CMT2-1 PANASONIC MODEL
CT-1350MG(CH.NMX-KS-1)



PANASONIC MODEL
CT-1350MG(CH,NMX-KS-1)

PANASONIC MODEL
CMT2-1 CT-1350MG(CH,NMX-KS-1)



MAIN BOARD

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MAIN BOARD

When ordering parts, state Model, Part Number, and Description

SEMICONDUCTORS (Select replacement transistor for best results)

ITEM No.	TYPE No.	MFGR. PART No.	REPLACEMENT DATA						ZENITH PART No.
			GENERAL ELECTRIC PART No.	MOTOROLA PART No.	NEW-TONE NTE PART No.	PHILIPS ECG PART No.	RCA PART No.	WORKMAN PART No.	
# D101 D102 D251	QB106P QB106P MA26W0 MA27W QA112R	TVSQB106P TVSQB106P TVSQA112R	GEZD-6.0 GEZD-6.0 GEZD-12	1N5340B 1N5340B 1N5242B	NTE5070A NTE5070A NTE605 NTE605 NTE5021A	ECG135A ECG135A ECG605 ECG605 ECG5021A	SK6V0/5070A SK6V0/5070A SK3864/605 SK7951 SK12A/5021A	WEP1153/5070 WEP1153/5070 WEP605/605 WEP605/605 WEP1423/5021	103-Z9008 103-Z9008 103-Z9044 103-Z9044 103-279-21
# D402 D504 D506	MA150 RH1S ERB28-04D ERB24-04D RU2M	TVSRH1S TVSRH1S TVSRU2M	GE-514 GE-511 GE-511 GE-511 GE-511	1N4935	NTE519 NTE552 NTE552 NTE552 NTE552	ECG519 ECG398 ECG398 ECG398 ECG398	SK3100/519 SK9000/552 SK9000/552 SK9000/552 SK9000/552	WEP925/519 WEP172/506 WEP172/506 WEP172/506 WEP172/506	103-131 103-287 103-287 103-287 103-287
# D507 D511 D513 D514	ERB12-01 B12-01 H29C1 QA111S ERB12-01 B12-01	TVSERB12-01 TVSHZ9C1 TVSQA111S TVSERB12-01	GE-504A GE-504A GEZD-9.1 GEZD-11 GE-504A GE-504A	1N4003 1N4003 1N5239B 1N4741A 1N4003 1N4003	NTE116 NTE116 NTE5018A NTE5074A NTE116 NTE116	ECG116 ECG116 ECG5018A ECG5074A ECG116 ECG116	SK3311 SK3311 SK9A1/5018A SK11V/5074A SK3311 SK3311	WEP156 WEP156 WEP1419/5018 WEP156/5074 WEP156 WEP156	212-76-02 212-76-02 103-279-18 103-Z9042 212-76-02 212-76-02
# D515 D701 D707 thru D710	RH1S ERB28-04D QA111S MA150	TVSRH1S TVSQA111S	GE-511 GE-511 GEZD-11 GE-514	1N4741A 1N4935	NTE552 NTE552 NTE5074A NTE519	ECG398 ECG398 ECG5074A ECG519	SK9000/552 SK9000/552 SK11V/5074A SK3100/519	WEP172/506 WEP172/506 WEP1156/5074 WEP925/519	103-287 103-287 103-Z9042 103-131
# D711 thru D714 D801 thru D804	QA112R RM10B CO510	TVSQA112R TVSC0510	GEZD-12 GE-510 GE-509	1N5242B 1N4007 1N4007	NTE5021A NTE125 NTE125	ECG5021A ECG125 ECG125	SK12A/5021A SK3081/125 SK3080	WEP1423/5021 WEP170/125 WEP170/125	103-279-21 212-Z9000 212-Z9000
# D805 thru D807 D808 D809 D810 D814 IC401 IC451 IC601	RH1S RU2AM RU2AM QA107R SR2K AN5436 AN5512 AN5310K,L, M CN5310K,L, M	TVSRH1S TVSRU2AM TVSRU2AM TVSQA107R TVSR2K	GE-511 GE-511 GE-511 GEZD-6.8	1N5235B	NTE552 NTE552 NTE5014A	ECG398 ECG398 ECG5014A	SK9000/552 SK9000/552 SK6A8/5014A	WEP172/506 WEP172/506 WEP1415/5014	103-287 103-287 103-287 103-Z9009
# D805 thru D807 D808 D809 D810 D814 IC401 IC451 IC601	RH1S RU2AM RU2AM QA107R SR2K AN5436 AN5512 AN5310K,L, M CN5310K,L, M	TVSRH1S TVSRU2AM TVSRU2AM TVSQA107R TVSR2K	GE-511 GE-511 GE-511 GEZD-6.8	1N5235B	NTE552 NTE552 NTE5014A	ECG398 ECG398 ECG5014A	SK9000/552 SK9000/552 SK6A8/5014A	WEP172/506 WEP172/506 WEP1415/5014	103-287 103-287 103-287 103-Z9009
# D805 thru D807 D808 D809 D810 D814 IC401 IC451 IC601	RH1S RU2AM RU2AM QA107R SR2K AN5436 AN5512 AN5310K,L, M CN5310K,L, M	TVSRH1S TVSRU2AM TVSRU2AM TVSQA107R TVSR2K	GE-511 GE-511 GE-511 GEZD-6.8	1N5235B	NTE552 NTE552 NTE5014A	ECG398 ECG398 ECG5014A	SK9000/552 SK9000/552 SK6A8/5014A	WEP172/506 WEP172/506 WEP1415/5014	103-287 103-287 103-287 103-Z9009
# D805 thru D807 D808 D809 D810 D814 IC401 IC451 IC601	RH1S RU2AM RU2AM QA107R SR2K AN5436 AN5512 AN5310K,L, M CN5310K,L, M	TVSRH1S TVSRU2AM TVSRU2AM TVSQA107R TVSR2K	GE-511 GE-511 GE-511 GEZD-6.8	1N5235B	NTE552 NTE552 NTE5014A	ECG398 ECG398 ECG5014A	SK9000/552 SK9000/552 SK6A8/5014A	WEP172/506 WEP172/506 WEP1415/5014	103-287 103-287 103-287 103-Z9009

TROUBLESHOOTING (Continued)

SYNC (Continued)

If there is no horizontal sync, check the voltages, waveforms and components, associated with pins 1, 2 and 3 of IC401.

RASTER

Check the CRT and CRT voltages. If the raster is magenta, check the voltages, waveforms and components associated with pin 27 of the Video/Chroma IC (IC601) and the Green Output Transistor (Q353). If the raster is yellow, check the voltages, waveforms and components associated with pin 18 of IC601 and the Blue Output Transistor (Q351). If the raster is cyan, check the voltages, waveforms and components associated with pin 26 of IC601 and the Red Output Transistor (Q352). If the raster has a keystone shape, check the Deflection Yoke. If the raster has height or width problems, refer to the "Vertical", "Horizontal" and "Power Supply" sections of this Troubleshooting guide.

Set the Video/RGB Switch to RGB position. If the raster is magenta, check the Green Buffer Transistor (Q702), Zener Diode D712, Diode D708 and associated circuitry. If the raster is yellow, check the Blue Buffer Transistor (Q703), Zener Diode D713, Diode D709 and associated circuitry. If the raster is cyan, check the Red Buffer Transistor (Q701), Zener Diode D711, Diode D707 and associated circuitry.

CHROMA

Set the Video/RGB Switch to Video position. Inject a color bar signal from an NTSC color generator at the Video In terminal. Check voltage, waveform and components associated with pin 13 of Video/Chroma IC (IC601). If the right waveform is present, check voltages, waveforms and components associated with pins 11, 19, 25 thru 28 of IC601. Check the 3.58MHz Oscillator at pins 21 and 22 of IC601 and check the 3.58MHz Crystal (X601).

If there is a wrong color or incorrect hue (tint), check the voltages, waveforms and components associated with pins 7 and 8 of IC601. Check for a blanking waveform at pins 20 and 24 of IC601. If there is no green, check voltages, waveforms and components associated with pin 27 of IC601 and the Green Output Transistor (Q353). If there is no blue, check voltages, waveforms and components associated with pin 28 of IC601 and the Blue Output Transistor (Q351). If there is no red, check voltages, waveforms and components associated with pin 26 of IC601 and the Red Output Transistor (Q352). Check CRT and CRT voltages and waveforms at pins 9, 10 and 5 for the green, blue and red colors.

CIRCUIT DESCRIPTION

HORIZONTAL OSCILLATOR DISABLE CIRCUIT

When B+ voltage rises too high, the voltage at the cathode of Zener Diode D511 also rises. If the voltage rises over the break point of Zener Diode D511 it will be turned On. When

Diode D511 is turned On, the voltage at pin 5 of Horizontal/Vertical/Oscillator/Drive IC (IC401) will rise causing the horizontal oscillator to shut down. The high voltage is monitored by pin 5 of IC401 through Resistor R424 which is connected to the Deflection Yoke.

SERVICE INFORMATION

HORIZONTAL OSCILLATOR DISABLE CIRCUIT TEST

SERVICE WARNING: The test must be made as a final check before set is returned to the customer.

1. With the rear cover removed, supply a nominal 120V AC to the set and turn on the power switch.
2. Adjust the customer controls to normal operating positions.
3. Short between TP801 and TP802 on the AC Input/Voltage Adjust Board with a jumper wire.
4. Confirm that the picture tube screen blacks out (horizontal oscillation stops).

Turn the power switch off as soon as picture blacks out, otherwise D814 and C816 will be damaged.
5. If this does not occur, the horizontal oscillator disable circuit is not operating.

Follow the Repair Procedures of Horizontal Oscillator Disable Circuit before the set is returned to the customer.

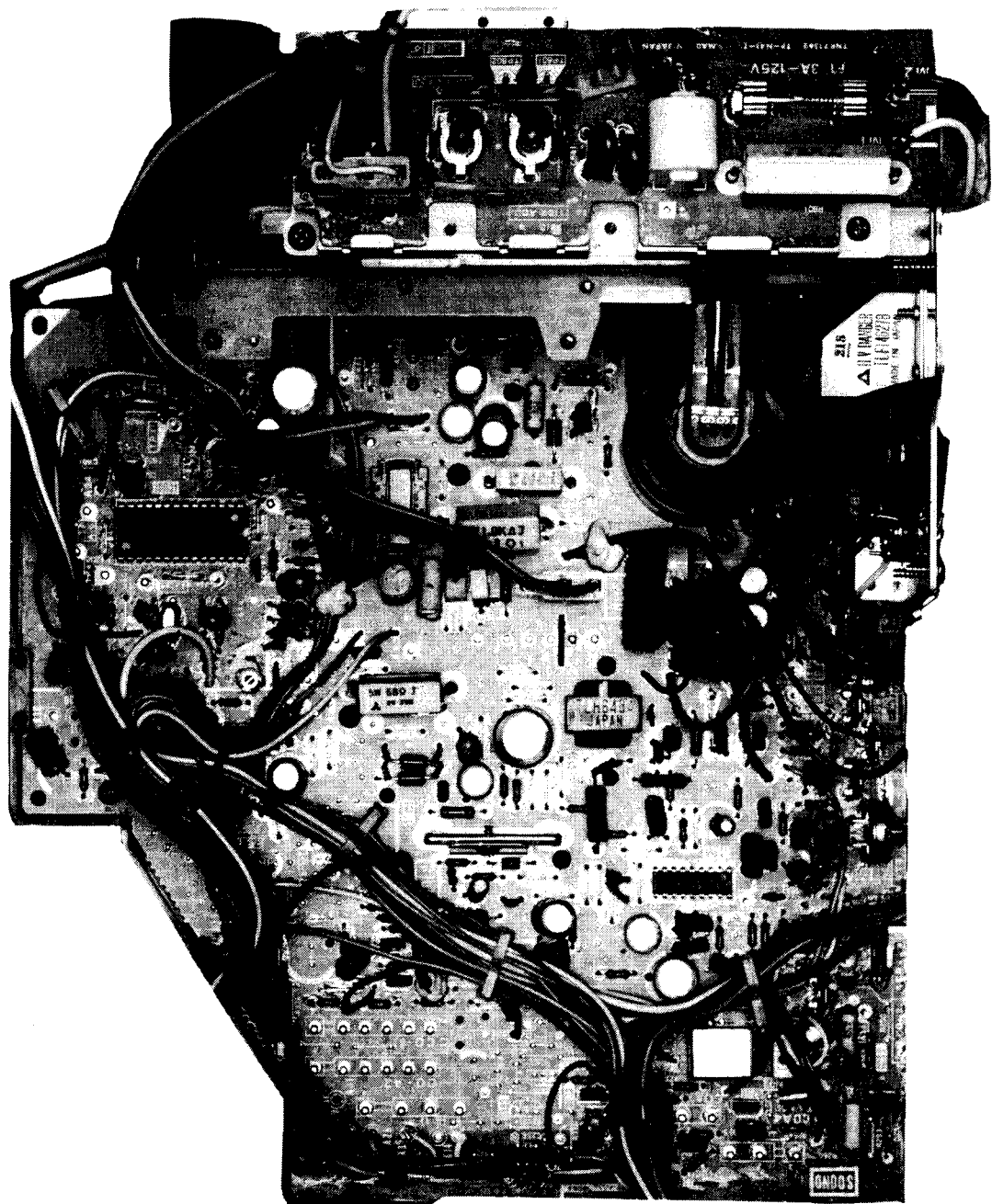
Courtesy of the Manufacturer

REPAIR PROCEDURES OF HORIZONTAL OSCILLATOR DISABLE CIRCUIT

1. Connect a DC voltmeter between the cathode of D511 and chassis ground of the main circuit board.
2. If nearly +9.0V is not present at that point, find the cause by checking R519, C535 and D511, and if it is, check IC401, C507 and R509.
3. Carefully check above specified parts, and related circuits and parts.

When the circuit is repaired, try the horizontal oscillator disable circuit test again.

PANASONIC MODEL
CT-1350MG(CH.NMX-KS-1)



CHASSIS-TOP VIEW

MAIN BOARD GridTrace LOCATION GUIDE

C238	M-2	C613	D-12	R312	Q-10	R627	F-14
C242	N-2	C614	E-12	R313	S-11	R630	C-13
C251	N-2	C615	F-12	R314	R-10	R632	F-14
C252	P-2	C616	A-13	R315	I-5	R633	F-16
C253	F-18	C617	B-12	R317	H-5	S501	J-14
C254	A-10	C618	E-14	R318	Q-11	SW351	S-6
C255	R-4	C621	F-14	R319	G-13	T501	M-11
C257	R-3	C622	B-12	R320	F-12	T502	O-17
C259	O-2	CO-A3	J-2	R321	G-13	T503	I-15
C301	D-17	CO-A4	P-1	R322	Q-5	TD301	O-4
C302	G-16	CO-A5	N-1	R374	E-10	TP12	J-6
C304	E-16	CO-A6	M-13	R375	D-9	TP20	F-14
C306	R-5	CO-A7	O-2	R376	C-10	TP44	C-14
C310	F-17	D101	I-10	R379	D-9	TPA10	B-15
C311	F-9	D102	I-9	R380	O-5	TPA46	F-15
C332	H-6	D251	S-2	R381	Q-3	TPD1	Q-12
C343	C-10	D402	Q-6	R382	E-10	TPD2	Q-11
C344	E-10	D504	L-17	R385	H-6	TPD3	P-7
C350	H-6	D506	J-19	R387	G-6	X601	D-13
C401	O-5	D507	P-12	R401	P-6		
C402	Q-7	D511	G-17	R402	P-6		
C406	O-6	D513	M-18	R406	Q-7		
C407	O-6	D514	K-8	R407	S-12		
C409	M-7	D515	R-13	R410	M-8		
C410	J-17	DY	M-12	R413	J-9		
C411	N-9	IC401	P-8	R414	J-8		
C413	L-6	IC451	I-8	R415	S-12		
C414	K-7	IC601	E-15	R417	K-14		
C415	J-7	L308	I-5	R418	H-18		
C416	J-9	L310	F-13	R420	J-7		
C417	K-10	L311	F-12	R424	L-9		
C418	O-6	L312	F-13	R429	Q-6		
C419	L-7	L401	Q-6	R430	O-6		
C420	O-5	L402	J-10	R433	R-6		
C421	L-6	L505	I-14	R434	Q-10		
C422	J-6	L601	A-15	R435	L-6		
C501	Q-8	L603	E-13	R437	J-7		
C502	R-9	L605	F-14	R503	R-6		
C503	Q-7	L606	E-16	R504	S-10		
C504	P-9	LC301	Q-3	R505	S-9		
C505	P-8	Q233	M-3	R506	O-8		
C506	N-6	Q251	P-2	R507	N-9		
C507	P-8	Q252	Q-3	R508	M-9		
C510	M-10	Q253	S-2	R509	P-9		
C511	K-17	Q301	H-6	R510	Q-8		
C515	P-14	Q302	I-5	R511	R-9		
C516	O-12	Q303	E-10	R512	R-7		
C517	P-10	Q502	N-10	R513	N-9		
C518	N-10	R117	I-11	R514	K-9		
C519	K-18	R244	N-3	R515	K-9		
C521	J-18	R245	N-3	R516	K-15		
C522	R-14	R247	N-3	R519	J-16		
C523	N-13	R249	M-3	R520	O-10		
C524	P-13	R251	R-4	R521	I-14		
C525	R-14	R252	R-3	R522	Q-13		
C526	P-10	R254	Q-2	R523	P-11		
C527	N-11	R255	O-2	R525	M-18		
C530	Q-8	R256	N-3	R528	R-12		
C535	G-17	R257	O-3	R529	P-11		
C540	L-17	R258	R-2	R531	R-18		
C542	O-12	R259	R-2	R532	K-17		
C543	O-13	R260	R-1	R535	K-16		
C544	O-13	R261	B-9	R536	R-15		
C545	O-13	R262	S-4	R540	M-16		
C601	B-16	R265	O-1	R601	E-11		
C603	C-16	R301	G-5	R604	B-16		
C604	C-16	R302	H-7	R608	G-15		
C605	A-12	R303	P-4	R609	B-13		
C606	B-13	R304	I-5	R610	B-13		
C607	B-12	R305	I-5	R612	E-12		
C608	C-12	R306	R-5	R618	G-14		
C609	C-13	R307	S-8	R620	D-12		
C610	B-14	R308	E-17	R622	M-5		
C612	H-12	R310	D-18	R624	R-7		

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PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

WIRING DATA

High Voltage Lead	Use BELDEN No. 9867 (30 KV)
Shielded Hook-up Wire	Use BELDEN No. 8401 or 8421 (Single-Conductor)
	8208 (Two-Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No. 8529 (Solid) Available in 13 Colors
	8522 (Stranded) Available in 13 Colors
300-Ohm Tuner Input Lead	Use BELDEN No. 8225
75-Ohm Tuner Input Lead	Use BELDEN No. 8241
300-Ohm Antenna Lead-In	Use BELDEN No. 8275 (Foam Core) or 8285 (Foam Jacketed)
Antenna Rotor Cable	Use BELDEN No. 8464 (Flat) or 8484 (Round) 4-Conductor
	8485 (Round) 5-Conductor
	8488 (Round) 8-Conductor

ELECTROLYTIC CAPACITORS

ITEM No.	RATING	MFGR. PART No.
C238	10 16V	ECEA1CS100
C242	1 50V	ECEA1HS010
C253	1000 25V	ECEA1ES102
C254	100 16V	ECEA1CS101
C255	47 25V	ECEA1ES470
C257	22 25V	ECEA1ES220
C302	4.7 NP 25V	ECEA1EN4R7S
C303	3.3 25V	ECEA1ES3R3
C304	2.2 50V	ECEA1HS2R2
C310	470 16V	ECEA1CS471
C311	470 16V	ECEA1CS471
C332	22 NP 16V	ECEA1CN220S
C343	220 16V	ECEA1CS221
C344	1 50V	ECEA1HS010
C358	10 250V	ECEA2ES100
C401	1 50V	ECEA1HS010
C407	3.3 16V	ECsz16EF3R3V
C409	3.3 35V	ECsF35E3R3K
C410	22 NP 25V	ECEA25N222
C411	10 25V	ECEA1ES100
C413	.1 50V	ECEA50ZR1
C415	3.3 50V	ECEA1HS3R3
C416	220 35V	ECEA1VS221
C417	1000 25V	ECEA1ES102
C419	220 35V	ECEA1VS221
C420	1000 16V	ECEA1CS102

For SAFETY use only equivalent replacement part.

ITEM No.	RATING	MFGR. PART No.
C422	1 50V	ECEA1HS010
C503	4.7 50V	ECEA50ZR47
C506	100 16V	ECEA16Z100
C507	10 16V	ECEA1CS100
C511	4.7 250V	ECEA2ES4R7
C515	3.3 250V	ECEA2ES3R3
C521	220 35V	ECEA1VS221
C524	220 25V	ECEA1ES221
C605	.22 50V	ECEA50ZR22
C606	.22 50V	ECEA50ZR22
C607	4.7 NP 25V	ECEA1EN4R7S
C608	.22 50V	ECEA50ZR22
C609	.1 50V	ECEA50ZR1
C701	22 NP 16V	ECEA1CN220S
C702	22 NP 16V	ECEA1CN220S
C703	22 NP 16V	ECEA1CN220S
C704	47 16V	ECEA1CS470
C705	47 16V	ECEA1CS470
C706	47 16V	ECEA1CS470
C708	3.3 NP 25V	ECEA1EN3R3S
C709	100 16V	ECEA1CS101
C710	47 16V	ECEA1CS470
C711	10 16V	ECEA1CS100
# C809	560 200V	ECET2DR561SW
# C812	100 50V	ECEA1HS101
# C816	100 250V	ECEA180V100

TROUBLESHOOTING AID

NOTE: Waveforms taken with triggered scope, Keyed-Rainbow generator. Schematic voltages measured with digital meter, no signal. Controls adjusted for normal operation.

PICTURE or SOUND

NO PIC, NO SOUND, NO RASTER: Check AC power supply and sources generated from Horizontal Output Transformer (T502). Refer to "Troubleshooting" Power Supply and Horizontal circuits.

NO PIC, HAS SOUND, NO RASTER: Check Horizontal Output Transformer (T502) sources and Video circuit. Refer to "Troubleshooting" Horizontal and Video circuits.

NO PIC, HAS SOUND, HAS RASTER: Refer to "Troubleshooting" Video circuit.

HAS PIC, NO SOUND: Refer to "Troubleshooting" Audio circuit.

LOW OR EXCESSIVE BRIGHTNESS: Check Video and Luminance circuits. Refer to "Troubleshooting" Video circuit.

SWEEP

NO RASTER, HAS SOUND: Check HV rectifier, Part of Horizontal Output Transformer (T502). Refer to "Troubleshooting" Horizontal circuit.

NO RASTER, NO SOUND: Refer to "Troubleshooting" Horizontal circuit.

NO VERT DEFLECTION: Refer to "Troubleshooting" Vertical circuit.

POOR VERT LIN OR FOLDOVER: Refer to "Troubleshooting" Vertical circuit.

POOR HORIZ LIN OR FOLDOVER: Refer to "Troubleshooting" Horizontal circuit.

NARROW PICTURE: Refer to "Troubleshooting" Horizontal circuit.

VERT OFF FREQUENCY: Refer to "Troubleshooting" Vertical circuit.

HORIZ OFF FREQUENCY: Refer to "Troubleshooting" Horizontal circuit.

SYNC

NO VERT/HORIZ SYNC: Refer to "Troubleshooting" Sync circuit.

RASTER

YELLOW (NO BLUE): Check Chroma and Blue Output circuits. Refer to "Troubleshooting" Raster circuit.

CYAN (NO RED): Check Chroma and Red Output circuits. Refer to "Troubleshooting" Raster Circuit.

MAGENTA (NO GREEN): Check Chroma and Green Output circuits. Refer to "Troubleshooting" Raster circuit.

COLOR (B/W operating normally)

NO COLOR: Refer to "Troubleshooting" Chroma circuit.

WEAK COLOR: Refer to "Troubleshooting" Chroma circuit.

NO COLOR SYNC: Refer to "Troubleshooting" Chroma circuit.

NO GREEN: Check Chroma and Green Output circuits. Refer to "Troubleshooting" Raster circuit.

NO BLUE: Check Chroma and Blue Output circuits. Refer to "Troubleshooting" Raster circuit.

NO RED: Check Chroma and Red Output circuits. Refer to "Troubleshooting" Raster circuit.

INCORRECT HUE (TINT): Refer to "Troubleshooting" Chroma circuit.

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TROUBLESHOOTING

POWER SUPPLY

It is important to use an isolation transformer in the AC supply before servicing a hot chassis. Check the AC Line Fuse (F1), if bad, check for possible shorts at the Bridge Rectifier Diodes (D801 thru D804), Degaussing Coil, Line Choke Coils (L801 and L805) and Switching Transistor (Q801). Replace defective parts.

Apply AC power and check for 120VAC from the cathode of Diode D801 to the cathode of Diode D802. If 120VAC is not present, check the On/Off Switch (SW801), Plug CO-V1, Coils L801 and L805 and Fuse F1. If the 120VAC is present, connect the ground lead of Digital Multimeter (D.M.M.) to the Common Tie Point (Hot ground) on the power supply board and check for 169V at the collector of Transistor Q801. Check waveforms at the base and collector of Transistor Q801. Check voltages, waveforms and components associated with +B Adjust Transistors (Q802 and Q803) and Diodes D806, D807, D809 and Zener Diode D810.

Connect the ground lead of D.M.M. to chassis ground (Cold ground) and check for 115V at the cathode of Diode D814. If 115V is not present, check Diodes D808 and D814, Transformer T801, Horizontal Output Transistor (Q551) and refer to "Horizontal" section of this Troubleshooting guide. If the 115V is present, check the B+ sources that are developed from the Horizontal Output Transformer (T502) and rectified by Diodes D504, D506 and D515.

If the 115V measures too high, check to see if the monitor is in shutdown. Check the voltage at pin 5 of Horizontal/Vertical Oscillator/Drive IC (IC401). If the TV is in shutdown, see the "Horizontal Oscillator Disable Circuit" in the Circuit Description section.

HORIZONTAL

Check for 115V at the collector of the Horizontal Output Transistor (Q551). If the voltage measures too high, check to see if the monitor is in shutdown. Check the voltage at pin 5 of Horizontal/Vertical/Oscillator/Drive IC (IC401). If the 115V is missing, check for 115V at pin 5 of the Horizontal Output Transformer (T502), if the 115V is missing, refer to the "Power Supply" section of this Troubleshooting guide.

Inject a horizontal signal at the base of Transistor Q551. If the high voltage returns, check the voltages, waveforms and components associated with Horizontal Drive Transistor (Q502) and pins 1, 2, 3, 4 and 6 of IC401. If the high voltage does not return, check Transistor Q551, Transformer T502, Pincushion Transformer (T503), Deflection Yoke and associated circuitry. The High Voltage Rectifier is part of Transformer T502 and may be defective.

Check for possible shorts at the B+ sources that are developed from Transformer T502 that could be loading down the horizontal circuits. Check for 161V at the cathode of Diode D504, 23.2V at the cathode of Diode D506, 12.28V at the cathode of Zener Diode D101 and 16.66V at the cathode of Diode D515.

Poor horizontal linearity or foldover problems may be caused by the condition of Capacitors C541 thru C545 and C529.

If the horizontal is off frequency, check voltages, waveforms and components associated with pins 1, 2, 3, 4 and 6 of IC401 and check Zener Diode D513.

AUDIO

Inject an audio signal at the Audio In terminal and check for sound on the speaker. If no audio, inject the signal at the base of Audio Amp Transistor (Q251). If sound is present at the speaker, check voltages and components associated with Audio Amp Transistors (Q233 and Q303). If sound is not present at the speaker, inject the audio signal at the base of Audio Output Transistor (Q252). If sound is present at the speaker, check Transistor Q251 and associated circuitry. If sound is not present, check Audio Output Transistors (Q252 and Q253), Diode D251, Electrolytic C253, Earphone Jack, Speaker and associated circuitry.

VIDEO

Set the Video/RGB Switch to Video position, inject a video signal at the Video In terminal. Check for picture on the CRT, if no picture, inject the video signal at TP12. If a picture appears on the screen of CRT, check the Video Inverter Transistor (Q301), Video Buffer Transistor (Q302) and associated circuitry. If the picture is still absent, check for a video waveform at pin 5 of Video/Chroma IC (IC601). Check voltages, waveforms and components associated with pins 26, 27 and 28 of IC601 and the Video Output Transistors (Q353, Q352 and Q351). Check CRT and CRT voltages. Check for a blanking waveform at pin 20 of IC601. In case of excessive brightness, check voltages, waveforms and components associated with pins 1 thru 5 of IC601.

Set the Video/RGB Switch to RGB position and check voltages and components associated with Red, Green and Blue Buffer Transistors (Q701, Q702 and Q703). Check voltages and components associated with Blanking Transistor (Q707), Bright Control Transistor (Q708) and Horizontal/Vertical Sync Mixer Transistor (Q706) and associated circuitry.

VERTICAL

Inject a vertical signal at pin 8 of Horizontal/Vertical/Oscillator/Drive IC (IC401). If the vertical deflection returns, check voltages, waveforms and components associated with pins 8 and 10 thru 15 of IC401. If the vertical deflection does not return, check voltages, waveforms and components associated with pins 2 thru 9 of the Vertical Output IC (IC451), Diode D514, Electrolytics C417 and C416 and the vertical winding on the Deflection Yoke.

Vertical linearity or foldover can be caused by vertical feedback and bias circuits. Check the condition of Diode D402, Electrolytics C411, C416 and C417. Use the Resistance Measurement Chart to check for possible changes in feedback and bias circuitry resistances.

If the vertical is off frequency, check the voltages, waveforms and components associated with pins 12, 13, 14 of IC401.

SYNC

If the monitor has no vertical or horizontal sync, check the voltages, waveforms and components associated with pins 16, 17 and 18 of the Horizontal/Vertical/Oscillator/Drive IC (IC401).

If there is no vertical sync, check the voltage, waveform and components associated with pin 14 of IC401.

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

SEMICONDUCTORS (Select replacement transistor for best results) (cont)

ITEM No.	TYPE No.	MFGR. PART No.	REPLACEMENT DATA						
			GENERAL ELECTRIC PART No.	MOTOROLA PART No.	NEW-TONE NTE PART No.	PHILIPS ECG PART No.	RCA PART No.	WORKMAN PART No.	ZENITH PART No.
Q233	2SD637Q,R 2SC1685R		GE-62+ GE-62 GE-62+ GE-62	2N5550* MPSA18* 2N5550* MPSA18*	NTE85+ NTE85 NTE85+ NTE85 NTE374	ECG85+ ECG85+ ECG85+ ECG374	SK3911 SK9229/85 SK3911 SK9229/85 SK9042/374	WEP66/199+ WEP705* WEP66/199+ WEP705* WEP374/374	121-881* 121-972* 121-881* 121-972* 121-29105
Q251	2SC1685R								
Q252	2SA885P,Q								
Q253	2SC1846P,Q								
Q301 thru Q303	2SD637Q,R 2SC1685R		GE-270 GE-62+ GE-62	MRF475 2N5550* MPSA18*	NTE295 NTE85+ NTE85	ECG85+ ECG85+ ECG157	SK9041/373 SK3911 SK9229/85	WEP913/295 WEP66/199+ WEP705*	121-880 121-881* 121-972*
Q351 thru Q353	2SC2258		GE-232	T1P50	NTE157		SK3747/157	WEP61/157	121-29016
Q502	2SC1573AQ		GE-222*	MPSA42*	NTE399	ECG294	SK9352/399	WEP68/287*	121-29045*
Q551	2SD950		GE-259	MJ12004	NTE389	ECG389	SK3710/238	WEP764/238	121-29001
Q701 thru Q703	2SD637R		GE-62+	2N5550*	NTE85+	ECG85+	SK3911	WEP66/199+	121-881*
Q706	2SC1685R		GE-62 GE-62+ GE-62	MPSA18* 2N5550* MPSA18*	NTE85 NTE85+ NTE85+ NTE85	ECG85+ ECG85+ ECG85+ ECG386	SK9229/85 SK3911 SK9229/85	WEP705* WEP66/199+ WEP705* WEP705*	121-972* 121-881* 121-972* 121-972*
Q707	2SB642R		GE-221*	2N5087*	NTE290A+	ECG290A+	SK3912	WEP907/234+	121-879*
Q708	2SA564AR		GE-65	2N5087*	NTE290A	ECG290A	SK3932/91	WEP564	121-879*
Q801	2SD637R		GE-62+	2N5550*	NTE85+	ECG85+	SK3911	WEP66/199+	121-881*
Q802	2SC1685R		GE-62 GE-62	MPSA18* 2N6547	NTE85 NTE386	ECG85+ ECG374	SK9229/85	WEP705*	121-972*
Q803	2SC1578 2SA900R 2SD637R 2SC1685R		GE-36 GE-62+ GE-62	2N5550* MPSA18*	NTE374 NTE85+ NTE85	ECG374 ECG85+	SK9039/386 SK9042/374 SK3911 SK9229/85	WEP770/283 WEP374/374 WEP66/199+ WEP705*	121-29090 121-29105 121-881* 121-972*

For SAFETY use only equivalent replacement part.

* Lead configuration may vary from original.

+ Rotate 180° to conform with original lead configuration.

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PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

CONTROLS (All wattages 1/2 watt, or less, unless listed)

ITEM NO.	FUNCTION	RESISTANCE	MFGR. PART NO.	NOTES
R203	Volume	50K	EVAL0AC20A54	
R306	Sub Contrast	10K	EVT0AA00B14	
R307	Sharpness	10K	EVH4TAS20B14	
R309	Panabrite	10K	EVJ6KAS20B14	
R311	Brightness	500	EVJ6KAS20B52	
R313	Sub Brightness	10K	EVT0AA00B14	
R351	Blue Drive	300	EVT0AA00B32	
R352	Red Drive	300	EVT0AA00B32	
R353	Green Low Light	10K	EVT0AA00B14	
R354	Red Low Light	10K	EVT0AA00B14	
R355	Blue Low Light	10K	EVT0AA00B14	
R373	Screen	4M	EVME0U00MB46	
R404	Vert Hold	20K	EVJ6KAS20C24	
R407	Vert Height	500	EVT0AA00B52 (18)	
R500	Focus			
R504	Horiz Hold	200	EVT0AA00B22	
R505	Sub Horiz Hold	1000	EVT0AA00B13	
R541	Over Voltage Adjust	10K	EVTV3US15B14	
R603	Color	10K	EVJ6KAS20B14	
R606	Tint	10K	EVJ6KAS20B14	
R740	RGB Bright	1000	EWHLPAS20B13	
R810	115V Adjust	2000	EVTV3US15B23	

For SAFETY use only equivalent replacement part.
(18) Part of Horizontal Output Transformer T502, Part Number TLF14627B.

RESISTORS (Power and Special)

ITEM No.	RATING	REPLACEMENT DATA		
		MFGR. PART No.	WORKMAN PART No.	REMARKS
D851	PTC 7.5 Cold	ERPF5B0M080F	FR605	
R117	68 5% 5W WW Non Flammable	ERF5AJ680		
R251	8.2 5% 1/2W Fusible Non Flammable	ERQ12HJ8R2		
R258	1 5% 1/2W Carbon Film Non Flammable	ERD12FJ1R0		
R259	1 5% 1/2W Carbon Film Non Flammable	ERD12FJ1R0		
R363	10K 5% 1W Metal Oxide Non Flammable	ERG1ANJ103H	22-3120	
R364	10K 5% 1W Metal Oxide Non Flammable	ERG1ANJ103H	22-3120	
R365	10K 5% 1W Metal Oxide Non Flammable	ERG1ANJ103H	22-3120	
R418	1800 5% 1/2W Carbon Film	ERD50TJ182	22-2102	
R434	150 5% 1/2W Carbon Film Non Flammable	ERD50FJ151	22-2076	
R508	10K 5% W Metal Oxide Non Flammable	ERG2ANJ103H	22-4120	
R513	4700 5% 1W Metal Oxide Non Flammable	ERG1ANJ472H	22-3112	
R516	1000 5% 3W WW Non Flammable	ERG3CJ102		
R519	220K 5% 1/4W Carbon Film	ERD25TJ224	22-1152	
R521	1000 5% 1W Metal Oxide Non Flammable	ERG1ANJ102	22-3096	
R522	22K 2% 1/2W Carbon Film Non Flammable	ERD12F62202	22-2256	
R525	1 5% 1/2W Carbon Film Non Flammable	ERD50FJ1R0P		
R532	1 5% 1/2W Fusible	ERQ12HJ1R0		
R535	2.4 5% 2W Fusible Non Flammable	ERQ2CJA2R4		

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

RESISTORS (Power and Special)(cont)

ITEM No.	RATING	REPLACEMENT DATA		
		MFGR. PART No.	WORKMAN PART No.	REMARKS
R536	1 5% 1/2W Fusible Non Flammable	ERQ12HJ1R0		
R542	15K 5% 1/4W Carbon Film	ERD25TJ153	22-1124	
R726	180 5% 2W Metal Oxide Non Flammable	ERG2ANJ181H	22-4078	
R801	1.5 10% 7W WW Non Flammable	ERF7AK1R5		
R806	68K 5% 1W Metal Oxide Non Flammable	ERG1ANJ683H	22-3140	
R807	150 5% 1W Metal Oxide Non Flammable	ERG1ANJ151H	22-3076	
R808	330 5% 1W Metal Oxide Non Flammable	ERG1ANJ331H	22-3084	
R809	1200 5% 1/4W Carbon Film	ERD25TJ122	22-1098	
R811	2700 5% /4W Carbon Film	ERD25TJ272	22-1106	
R812	470 5% 1/4W Carbon Film	ERD25TJ471	22-1088	
R813	12K 5% 3W WW Non Flammable	ERG3ANJ123H		
R814	33 5% 2W Metal Oxide Non Flammable	ERG2ANJ330H	22-4060	
R816	2200 5% 1W Metal Oxide Non Flammable	ERG1ANJ222H	22-3104	
R818	68K 5% 1/2W Carbon Film	ERD50TJ683	22-2140	
R819	1 5% 1/2W Fusible Non Flammable	ERQ12HJ1R0		
R820	.56 10% 1/2W Metal Oxide Non Flammable	ERW12PKR56		
R901	1000 10% 1/2W Carbon Film		22-2096	

For SAFETY use only equivalent replacement part.

COILS (RF-IF)

ITEM No.	FUNCTION	MFGR. PART No.	ITEM No.	FUNCTION	MFGR. PART No.
L308	RF Choke (22uH)	TLQ220K126	L601	Peaking (22uH)	TLT220K999G
L310	Peaking (33uH)	TLQ330K126Y	L603	Peaking (33uH)	TLT330K999G
L311	Peaking (33uH)	TLQ330K126K	L605	Peaking (5.4mH)	TLT542K999G
L312	Peaking (33uH)	TLQ330K126K	L801	Line Choke	TLP6502P
L401	RF Choke (150uH)	TLT151K999G	L805	Line Choke	
L402	RF Choke (12uH)	TLT120K999G	LC301	3.58MHz Trap	TLK156001
L505	Linearity	TLH6623P	TD301	Delay Line	TLK150810

For SAFETY use only equivalent replacement part.

COILS & TRANSFORMERS (Sweep Circuits)

ITEM No.	FUNCTION	REPLACEMENT DATA		
		MFGR. PART No.	OTHER IDENTIFICATION	THORDARSON PART No.
DY1	Yoke Horiz 1.98mH 90° Vert 35mH	TLY15302A3		
T501	Horiz Drive	TLH6434		
T502	Horiz Output	TLF14627B		
T503	Pincushion	TLH8706		
T801	Power	TLP15775		
T802	Trigger	TLP15952		

For SAFETY use only equivalent replacement part.

SPEAKER

ITEM No.	TYPE	REPLACEMENT DATA		NOTES
		MFGR. PART No.	QUAM PART No.	
SP1	3" PM 16 Ohms	EAS8P48SCH	30A05Z16R	

PANASONIC MODEL
CT-1350MG(CH.NMX.KS-1)

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

FUSE DEVICES

ITEM No.	DESCRIPTION	REPLACEMENT DATA				NOTES
		MFR. PART No.		BUSS PART No.		
		DEVICE	HOLDER	DEVICE	HOLDER	
# F1	3 Amp @ 125V Slow-Blow	XBA1F30NU14A	TJC6319 (1)	MDX 3	1A1907-02	

For SAFETY use only equivalent replacement part.
(1) Two used.

MISCELLANEOUS

ITEM No.	PART NAME	MFGR. PART No.	NOTES
# J2	Socket	TJS29530	AC Power
J9	Jack	TJS37140	Earphone
L503	Ferrite Bead	TLP408	
L504	Ferrite Bead	TSC911-4	
L606	Ferrite Bead	TLP408	
L802	Ferrite Bead	TLP408	
L804	Ferrite Bead	TLP408	
L900	Coil	TLK159080H	Degaussing
# N801	Lamp	XANT322	Neon-Power On
# P2	Cord	TSX1167-1	AC Power
# S501	Spark Gap	TGPS152G1	
SW351	Switch	EVQR4AL13	Service/Normal/VTR
SW701	Switch	TSE70408	Video/RGB
SW702	Switch	ESD1411B	75/HI Z (Impedance)
# SW801	Switch	ESB9937T	Power
V1	CRT	370GHB22	
X601	Crystal	TSS816M	3.58MHz
	Magnet	TLC2024-2S	Convergence Yoke
	P.C. Board	TNP71876	Main
	P.C. Board	TNP72942	CRT
	P.C. Board	TNP72943	RGB Input
#	P.C. Board	TNP71563	Power Supply (Alt. TNP71560)
#	P.C. Board	TNP72944	Control (Alt. TNP72946)
#	P.C. Board	TNP71562	AC Input/Voltage Adjust
	Socket	TJS35030	CRT
	Wedge	TZF70302	Yoke Adjustment

For SAFETY use only equivalent replacement part.

CABINET & CABINET PARTS (When ordering specify model, chassis & color)

ITEM	PART No.	ITEM	PART No.
Cabinet	TXFKY01M1	Hinge (2 used)	TKK769905
Cabinet Back	TXFKU01M1	Stand	TKK760401
Glass Front	TKG769701	Door Lock	TKK769906
Hood	TXFKK02M1	Indicator Panel	TXFKP01M1
Feet-Front (2 used)	TBL763302	Knob-Sound	TBX7653200
Feet-Rear (2 used)	TBL763303	Knob-Power	TBX7680800
Door	TKP7610175	Knob-Monitor	TBX7681500

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

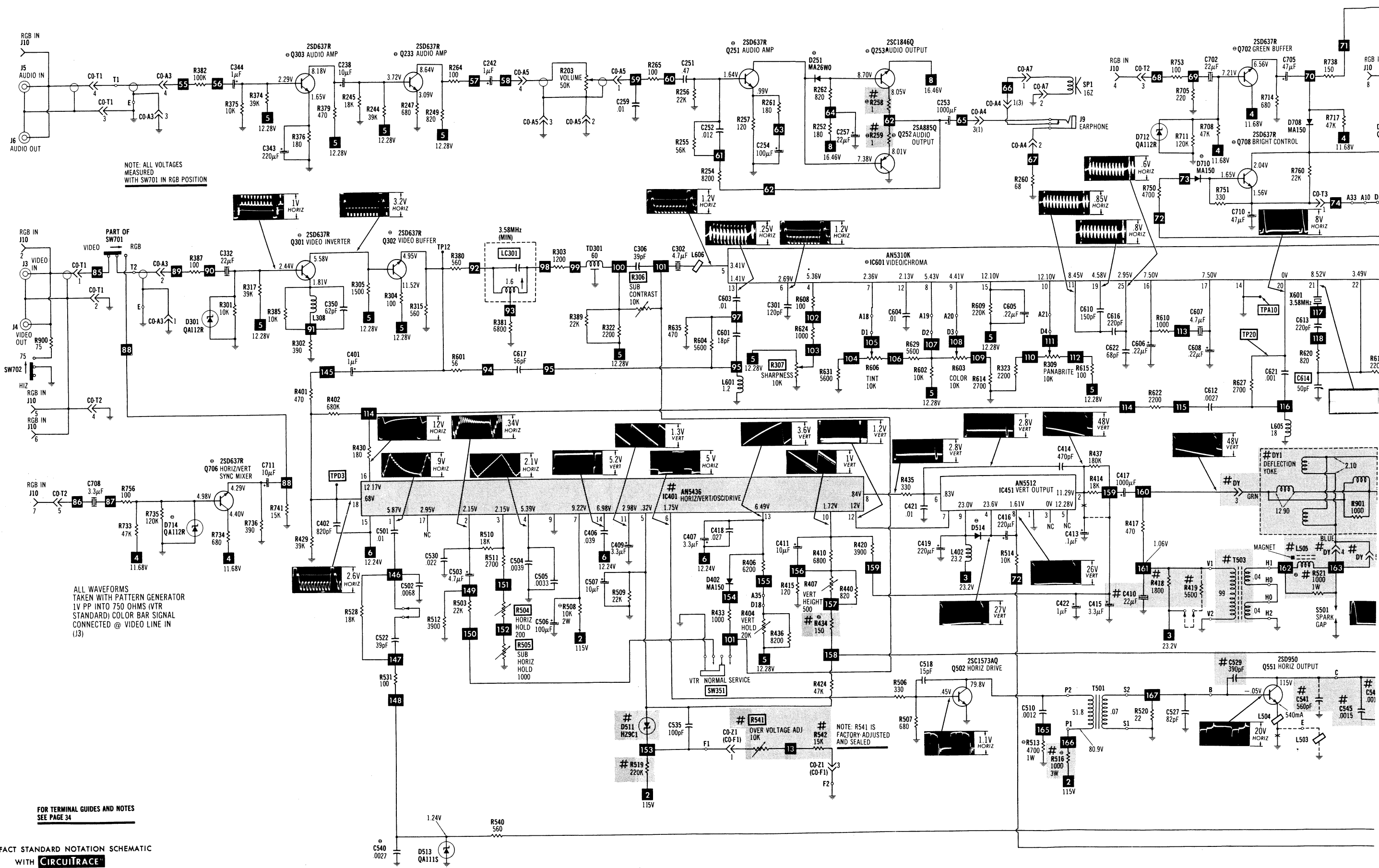
CAPACITORS

ITEM No.	RATING	MFGR. PART No.
C251	.47 50V 10%	ECQM1H474KZ
C252	.012 50V 10%	ECQM1H123KZ
C259	.01 50V 10%	ECQM1H103KZ
C301	120 50V 10%	ECCF1H121K
C306	39 50V 10%	ECCF1H390K
C320	15 50V 10%	ECCF1H150K
C321	15 50V 10%	ECCF1H150K
C322	15 50V 10%	ECCF1H150K
C350	62 50V 5%	ECCF1H620JC
C351	470 50V 10%	ECKF1H471KB
C352	470 50V 10%	ECKF1H471KB
C353	470 50V 10%	ECKF1H471KB
C354	.0022 1KV	ECQE10222MV
C355	56 50V	
C359	.0015 1KV	ECQE10152MV
C361	.068 50V 10%	ECQM1H683KZ
C402	820 50V 10%	ECKF1H821KB
C406	.039 50V 10%	ECQM1H393KZ
C414	470 50V 10%	ECKF1H471KB
C418	.027 50V 10%	ECQM1H273KZ
C421	.01 50V 10%	ECQM1H103KZ
C501	.01 50V 10%	ECQM1H103KZ
C502	.0068 50V 10%	ECQM1H682KZ
C504	.0039 50V 10%	ECQM1H392KZ
C505	.0033 630V 10%	ECQF6332KZ
C510	.0012 500V 10%	ECKD2H122KB2
# C516	.0015 2KV 10%	ECKD3D152KBU
# C517	.0056 50V 10%	ECQM1H562KZ
C518	15 500V 10%	ECCD2H150K
C519	.0012 500V 10%	ECKD2H122KB2
C522	39 50V 5%	ECCF1H390J
# C523	.3 200V 5%	ECQF2H304JZA
C525	220 500V 10%	ECCD2H221K2
# C526	.0047 50V 10%	ECQM1H472KZ
# C527	82 50V 10%	ECCF1H820K
# C529	390 2KV 10%	ECKD3D391KBN
C530	.022 50V 10%	ECQM1H223KZ
C535	100 50V 10%	ECCF1H101K

For SAFETY use only equivalent replacement part.

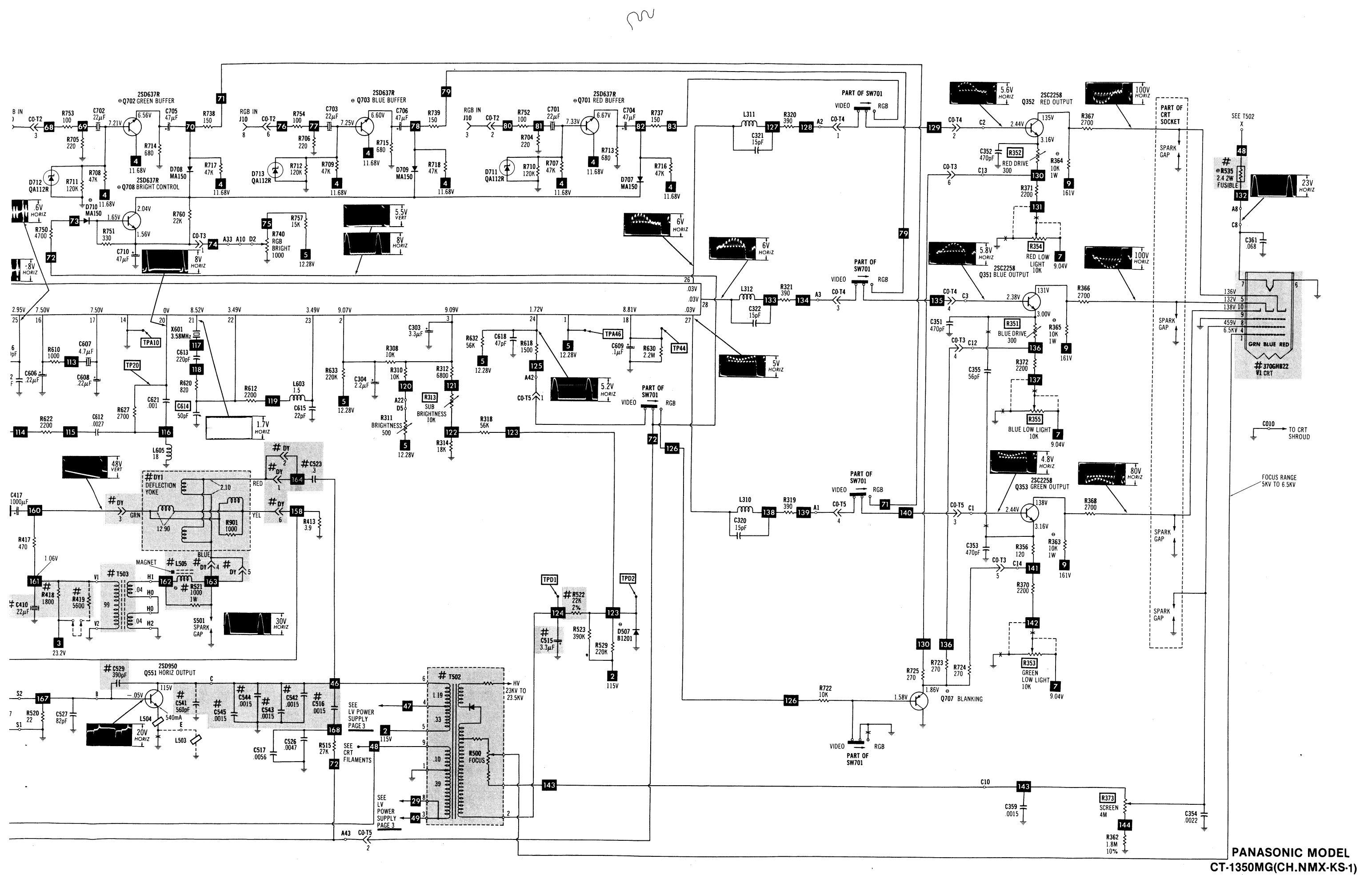
ITEM No.	RATING	MFGR. PART No.
C540	.0027 50V 10%	ECQM1H152KZ
# C541	.0015 50V 10%	ECKD3D561KBN
# C542	560 2KV 10%	ECKD3D152KBU
# C543	.0015 2KV 10%	ECKD3D152KBU
# C544	.0015 2KV 10%	ECKD3D152KBL
# C545	.0015 2KV 10%	ECKD3D152KBL
C601	18 NPO 50V ±.25	ECCF1H180JC
C603	.01 50V 10%	ECQM1H103KZ
C604	.01 50V	ECKF1H103ZF
C610	150 50V 5%	ECCF1H151J
C612	.0027 50V 10%	ECQM1H272KZ
C613	220 NPO 50V 5%	ECCF1H221JC
C614	Trimmer	ECV1ZW50X32
C615	22 NPO 50V ±.25	ECCF1H220JC
C616	220 50V 10%	ECCF1H221K
C617	56 NPO 50V 5%	ECCF1H560JC
C618	47 50V 10%	ECCF1H470K
C621	.001 50V 10%	ECKF1H102KB
C622	68 NPO 50V 5%	ECCF1H680JC
# C803	.082 1KV	ECQU1A823ME
# C805	.01 500V	ECKM2H103PE7
# C806	.01 500V	ECKM2H103PE7
# C807	.01 500V	ECKM2H103PE7
# C808	.01 500V	ECKM2H103PE7
# C810	.1 50V 10%	ECQM1H104KZ
# C813	.47 100V 10%	ECQE1474KZ
# C814	220 50V 10%	ECCF1H221K
# C815	.022 600V	ECQM6223MZ
# C817	.39 250V 10%	ECQE2394KZ
# C821	.01 1KV	ECQU1A103ME
# C822	270 2KV 10%	ECKD3D271KBN
# C823	.01 1KV	ECQU1A103ME
# C827	.01 1KV	ECQU1A103ME
# C828	.01 1KV	ECQU1A103ME
# C830	390 2KV 10%	ECKD3D391KBN
C840	470 125VAC	
C841	470 125VAC	

CMT2-1 PANASONIC MODEL CT-1350MG(CH.NMX-KS-1)

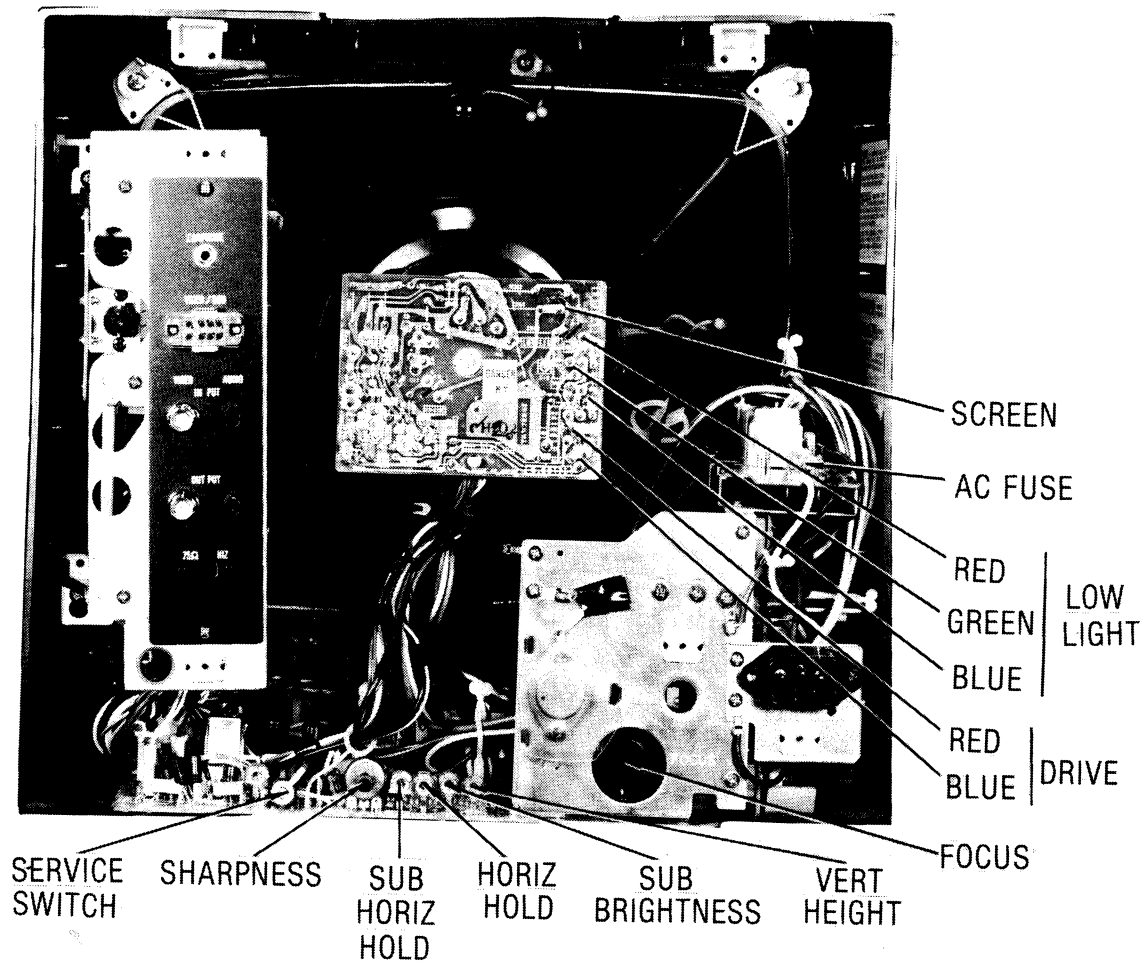


A PHOTOFACT STANDARD NOTATION SCHEMATIC
WITH **CIRCUITRACE**

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PANASONIC MODEL
CT-1350MG(CH.NMX-KS-1)



CABINET—REAR VIEW

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

Remove eight screws holding cabinet back and remove back. Disconnect HV anode, CRT socket, deflection yoke connector, degaussing coil connector, speaker connector and ground leads. Remove two screws holding Video/RGB assembly to cabinet side and remove assembly from cabinet. Lift main chassis assembly and remove assembly from cabinet. Remove three screws holding secondary control assembly to cabinet front and remove assembly from cabinet.

CRT REMOVAL

Follow "Chassis Removal" procedure and lay set facedown on a soft protective surface. Loosen and remove CRT neck assemblies, remove four screws holding CRT to cabinet front and lift CRT out of cabinet. Do not lift CRT by the neck.

SERVICING IN THE FIELD

CRT IMPLOSION PROTECTION AND CLEANING

Implosion protection is an integral part of the picture tube, cleaning accomplished without CRT removal.

FUSE DEVICES

A 3-amp fuse is used for AC line protection. (See photo, Cabinet - Rear View.)

HORIZONTAL OSCILLATOR

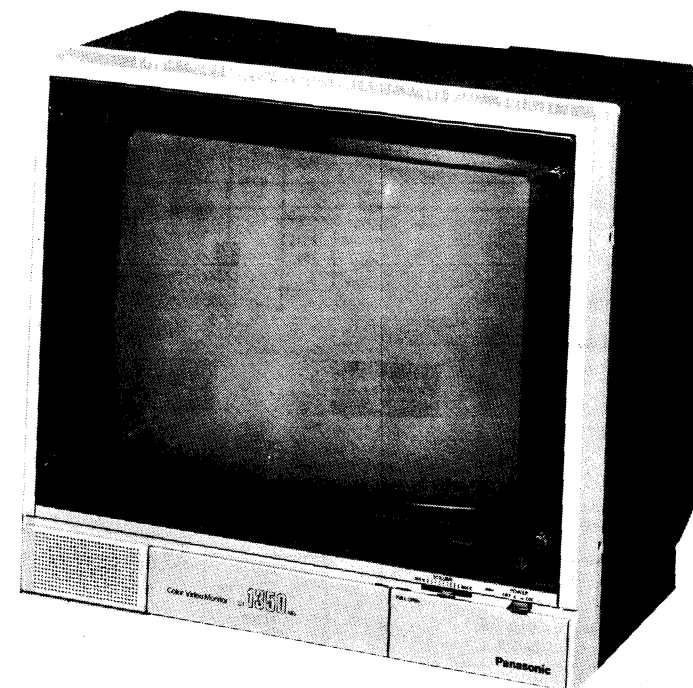
Coarse adjustment of the horizontal hold is accomplished

by the proper setting of the sub horizontal hold control. (See photo, Cabinet - Rear View.)

Fine adjustment of the horizontal hold is accomplished by the proper setting of the horizontal hold control. (See photo, Cabinet - Rear View.)

FOCUS

The focus may be varied by a focus control. (See photo, Cabinet - Rear View.)



PANASONIC MODEL CT-1350MG(CH.NMX-KS-1) CMT2-1

PANASONIC MODEL CT-1350MG(CH.NMX-KS-1) CMT2-1

PRELIMINARY SERVICE CHECKS

Enclosed

SAFETY PRECAUTIONS

See page 4.

SAFETY INFORMATION

See page 23.

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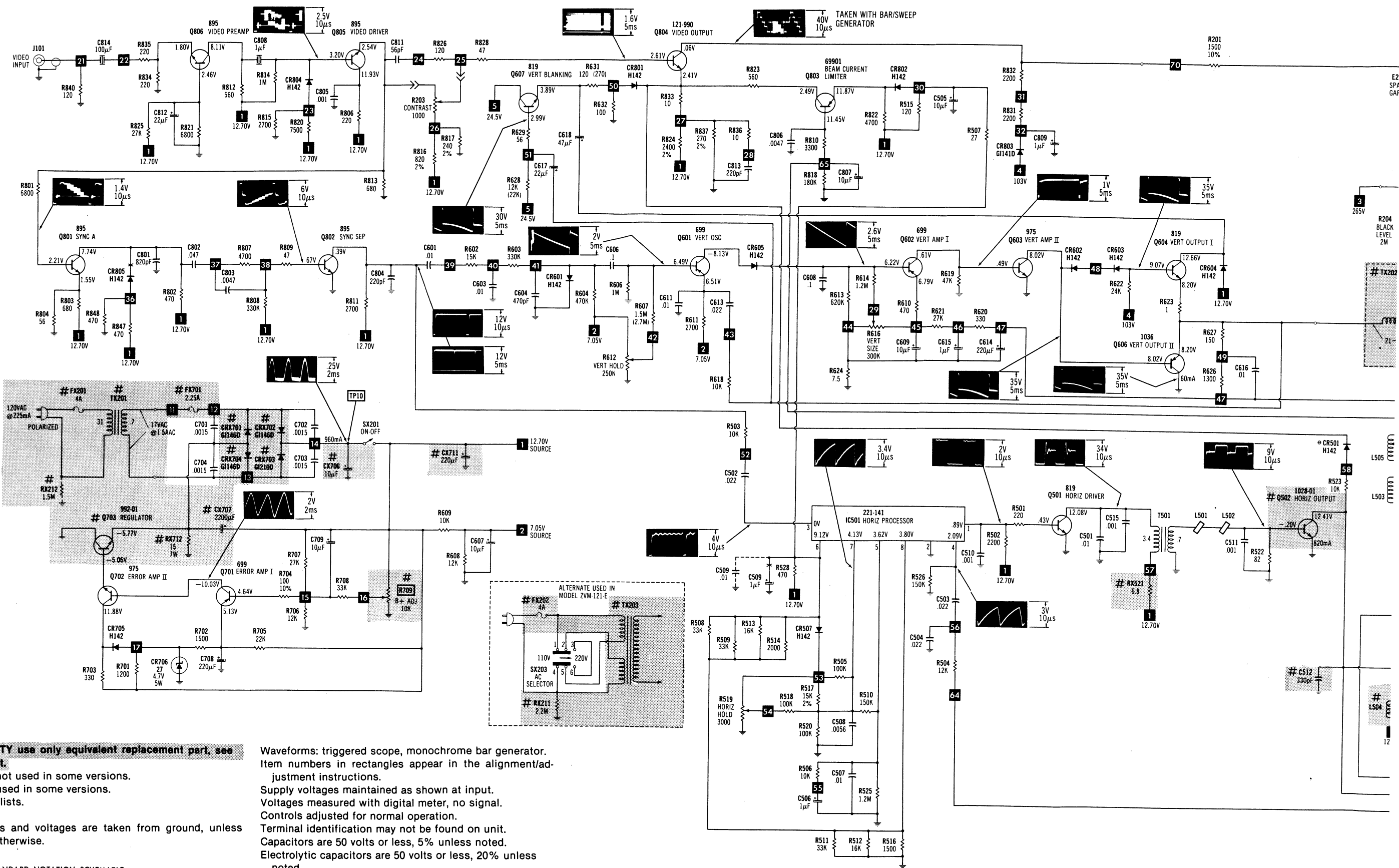


SAMS Howard W. Sams & Co., Inc. 4300 West 62nd Street, P.O. Box 7092, Indianapolis, Indiana 46206 U.S.A.

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed.

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For SAFETY use only equivalent replacement part, see parts list.

--- Circuitry not used in some versions.

--- Circuitry used in some versions.

• See parts lists.

⊕ Ground

Waveforms and voltages are taken from ground, unless noted otherwise.

Waveforms: triggered scope, monochrome bar generator. Item numbers in rectangles appear in the alignment/ad-justment instructions.

Supply voltages maintained as shown at input. Voltages measured with digital meter, no signal. Controls adjusted for normal operation. Terminal identification may not be found on unit. Capacitors are 50 volts or less, 5% unless noted. Electrolytic capacitors are 50 volts or less, 20% unless noted.

Resistors are 1/2W or less, 5% unless noted. Measurements with switching as shown, unless noted.

TROUBLESHOOTING (Continued)

VIDEO

Check the voltages and waveforms on the CRT and check the CRT. Inject a video signal at the Video Input Jack (J101) and check for video waveforms at the bases of Video Preamplifier Transistor (Q804) and Video Driver Transistor (Q805) to isolate the defective stage. If there is no vertical blanking, check for a vertical blanking waveform at the base of Vertical Blanking Transistor (Q607). If there is no horizontal blanking, check Diode CR501.

Note: Beam Current Limiter Circuit is only activated when the beam current is too high. This protects the phosphorous on the CRT from being burned during prolonged use.

VERTICAL

Inject a vertical signal at the base of Vertical Amplifier I Transistor (Q602). If vertical deflection returns, check the voltages, waveforms, and components associated with the Vertical Oscillator Transistor (Q601).

If vertical deflection does not return, check the voltages, waveforms, and components associated with Vertical Amplifier II Transistor (Q603), Vertical Output I Transistor (Q604) and Vertical Output II Transistor (Q606).

For vertical retrace, check Vertical Blanking Transistor (Q607). Vertical linearity or foldover problems can be caused by vertical feedback or bias circuits. Use the resistance chart to check for possible changes in feedback and bias circuitry.

Also, check the vertical winding of the Deflection Yoke (TX202) and associated circuitry.

SYNC

Check for vertical and horizontal waveforms at the collector of Sync Separator Transistor (Q802). If the waveforms are present, check voltages, waveforms, and components associated with Sync A Transistor (Q801) and Transistor Q802.

ADJUSTMENT

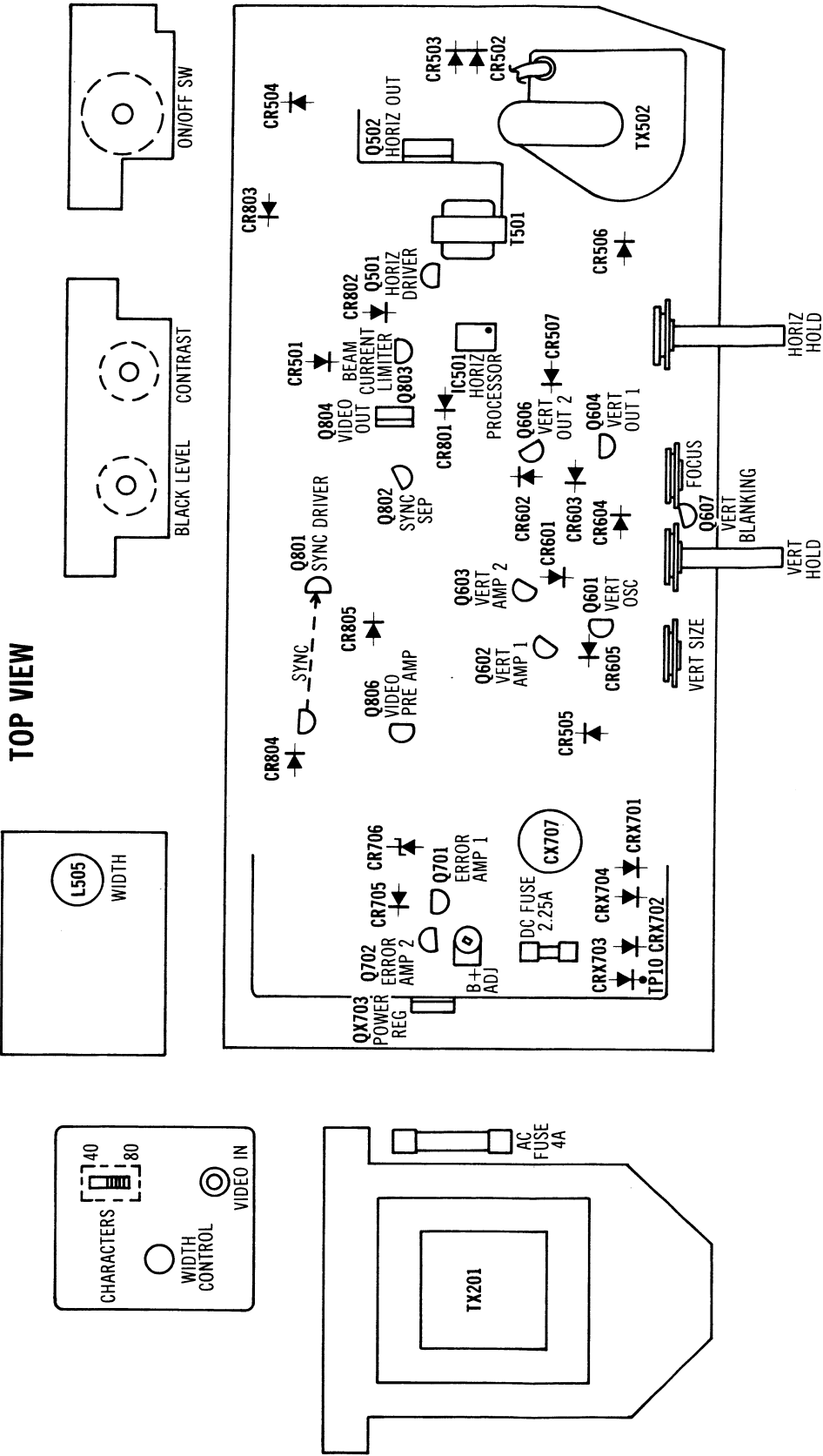
B + ADJUSTMENT

Connect a DC voltmeter to TP10. Adjust B + Adjust Control (R709) for 12.70V.

RESISTANCE MEASUREMENTS

MEASUREMENTS TAKEN WITH LOW POWER OHMS METER														
ITEM	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7	PIN 8	PIN 9	PIN 10	PIN 11	PIN 12	PIN 13	PIN 14
IC501	2222	0	1019	1020	1NF	125	12K	747						
VX201	30K	1NF	FIL	FIL	30K	1.9M	676K							
ITEM	E	B	C		ITEM	E	B	C		ITEM	E	B	C	
Q501	0	2440	32		Q606	120K (1)	1NF	0		Q802	0	326	2725	
Q502	0	.77	22		Q607	217	1NF	1NF		Q803	4667	19K	795	
Q601	8030	600K	1.7M		Q701	2420	6800	1NF		Q804	251	483	1NF	
Q602	70K (1)	414K	47K		Q702	1NF	1NF	348		Q805	434	1NF	240	
Q603	0	47K	1NF		Q703	15	1NF	0		Q806	217	5399	579	
Q604	120K (1)	160K	1NF		Q801	51	7122	484						

(1) Reading may vary according to the condition of the electrolytic in the circuit.



CMT2-2 ZENITH
MODEL ZVM-121

PLACEMENT CHART

SAFETY PRECAUTIONS

PRODUCT SAFETY SERVICING GUIDELINES

CAUTION: Do not attempt to modify any circuit. Perform service work only after you are thoroughly familiar with all of the following safety checks and servicing guidelines. To do otherwise increases the risk of potential hazards and injury to the user. CAUTION: Never attempt to service a chassis that is connected directly to an AC line. Make sure it is connected through an isolation transformer. No matter which way the AC plug is inserted, a potential shock hazard is present at chassis ground unless you use an isolation transformer during servicing. Since one side of the AC in-

put is fused; there's a 50% chance you'll blow a fuse, or a 50% chance you'll destroy components and/or test equipment without an isolation transformer. The chassis consists of a single circuit board mounted horizontally in the bottom of the cabinet. All circuit parts are mounted on the board except the CRT and deflection yoke. The horizontal sweep transformer is also mounted on the chassis circuit board. You can slide the board out of the cabinet without disconnecting it, and the Monitor will operate with the board exposed. Screws are not required to hold the board in place. It slides into slots which are molded into the cabinet, and the cabinet back holds it in place.

SAFETY CHECKS

After the original service problem has been corrected, check for the following:

FIRE & SHOCK HAZARD

1. Be sure that all components are positioned in such a way to avoid the possibility of adjacent component shorts. This is especially important on those chassis which are transported to and from the repair shop.

2. Never release a repair unless all protective devices such as insulators, barriers, cover shields, strain reliefs, and other hardware have been reinstalled per the original design.

3. Inspect the soldering for possible cold solder joints, frayed leads, damaged insulation (including AC cord), solder splashes or sharp solder points. Remove all loose foreign particles.

4. Check "across-the-line" capacitors and other components for physical evidence of damage or deterioration, and replace them if necessary. Follow the original layout, lead length, and dress.

5. No lead or component should touch a receiving tube or a resistor rated at 1 watt or more. Avoid lead tension around protruding metal surfaces.
6. Always replace critical components (marked # on the Schematic Diagram and parts lists) such as: fuses, flameproof resistors, capacitors, etc. with exact Zenith types. Do not use replacement components other than those specified or make unrecommended circuit modifications.

7. After you reassemble the set, always perform an AC leakage test on all exposed metallic parts of the cabinet to be sure the set is safe to operate without danger of electrical shock. DO NOT USE A LINE ISOLATION TRANSFORMER DURING THIS TEST. Use an AC voltmeter with a 5000 ohms per volt or more sensitivity in the following manner: Connect a 1500 ohm, 10-watt resistor (63-10401-76), paralleled by a 0.15 μ F, 150 VAC type capacitor (22-4384), between a known good earth ground (water pipe, conduit, etc.) and the exposed metallic parts, one at a time. Measure the AC voltage across the combination 1500 ohm resistor and 0.15 μ F capacitor. Reverse the AC plug and repeat AC voltage measurements for each exposed metallic part. Voltage measured must not exceed 0.75 volts rms. This corresponds to 0.5 milliamps AC. Any value exceeding this limit constitutes a potential shock hazard and must be corrected immediately.

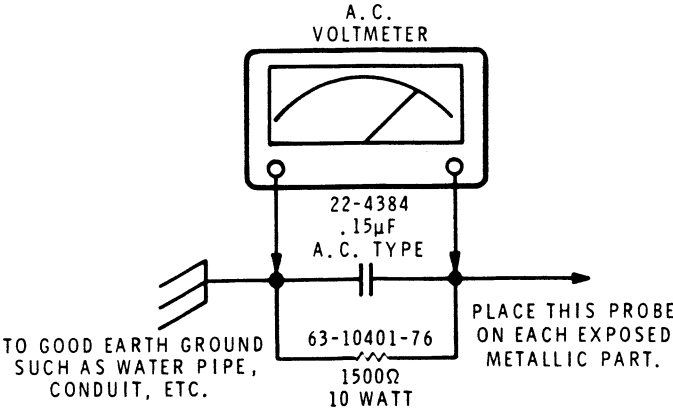


Figure 1-1

Courtesy of the Manufacturer

TROUBLESHOOTING AID

Note: Waveforms taken with triggered scope, Keyed-Rainbow generator. Schematic voltages measured with digital meter, no signal. Controls adjusted for normal operation.

PICTURE

NO PIC, NO RASTER: Check AC power supply and sources generated from Horizontal Output Transformer (TX502). Refer to "Troubleshooting" Power Supply and Horizontal circuits.

NO PIC, NO RASTER: Check Horizontal Output Transformer (TX502) sources and Video circuit. Refer to "Troubleshooting" Horizontal and Video circuits.

NO PIC, HAS RASTER: Refer to "Troubleshooting" Video circuit.

LOW OR EXCESSIVE BRIGHTNESS: Check Video and Luminance circuits. Refer to "Troubleshooting" Video circuit.

SWEEP

NO RASTER: Check HV rectifier, Part of Horizontal Output Transformer (TX502) and Horizontal circuit. Refer to "Troubleshooting" Horizontal circuit.

NO VERT DEFLECTION: Refer to "Troubleshooting" Vertical circuit.

POOR VERT LIN OR FOLDOVER: Refer to "Troubleshooting" Vertical circuit.

POOR HORIZ LIN OR FOLDOVER: Refer to "Troubleshooting" Horizontal circuit.

NARROW PICTURE: Refer to "Troubleshooting" Horizontal circuit.

VERT OFF FREQUENCY: Refer to "Troubleshooting" Vertical circuit.

HORIZ OFF FREQUENCY: Refer to "Troubleshooting" Horizontal circuit.

SYNC

NO VERT/HORIZ SYNC: Refer to "Troubleshooting" Sync circuit.

TROUBLESHOOTING

POWER SUPPLY

The 12.70V source voltage at the cathodes of Diodes CRX702 and CRX703 is missing. Check the AC Fuse (FX201). If the fuse is open, check the primary winding of the Power Transformer (TX201) for a short.

Check the DC fuse (FX701). If the fuse is open, check the Bridge Rectifiers (CRX701 thru CRX704) for shorts. Also check all the associated components for shorts.

If the fuses are good, and the 12.70V source voltage is missing or the voltage is incorrect, check the adjustment of B+ Adjust Control (R709). Also, check ERROR AMP Transistors (Q701 and Q702), Regulator Transistor (Q703) and associated components.

HORIZONTAL

For a loss of High Voltage, check for 12.41V at the collector of Horizontal Output Transistor (Q502). If the 12.41V voltage is missing, check for 12.41V at pin 3 of the Horiz-

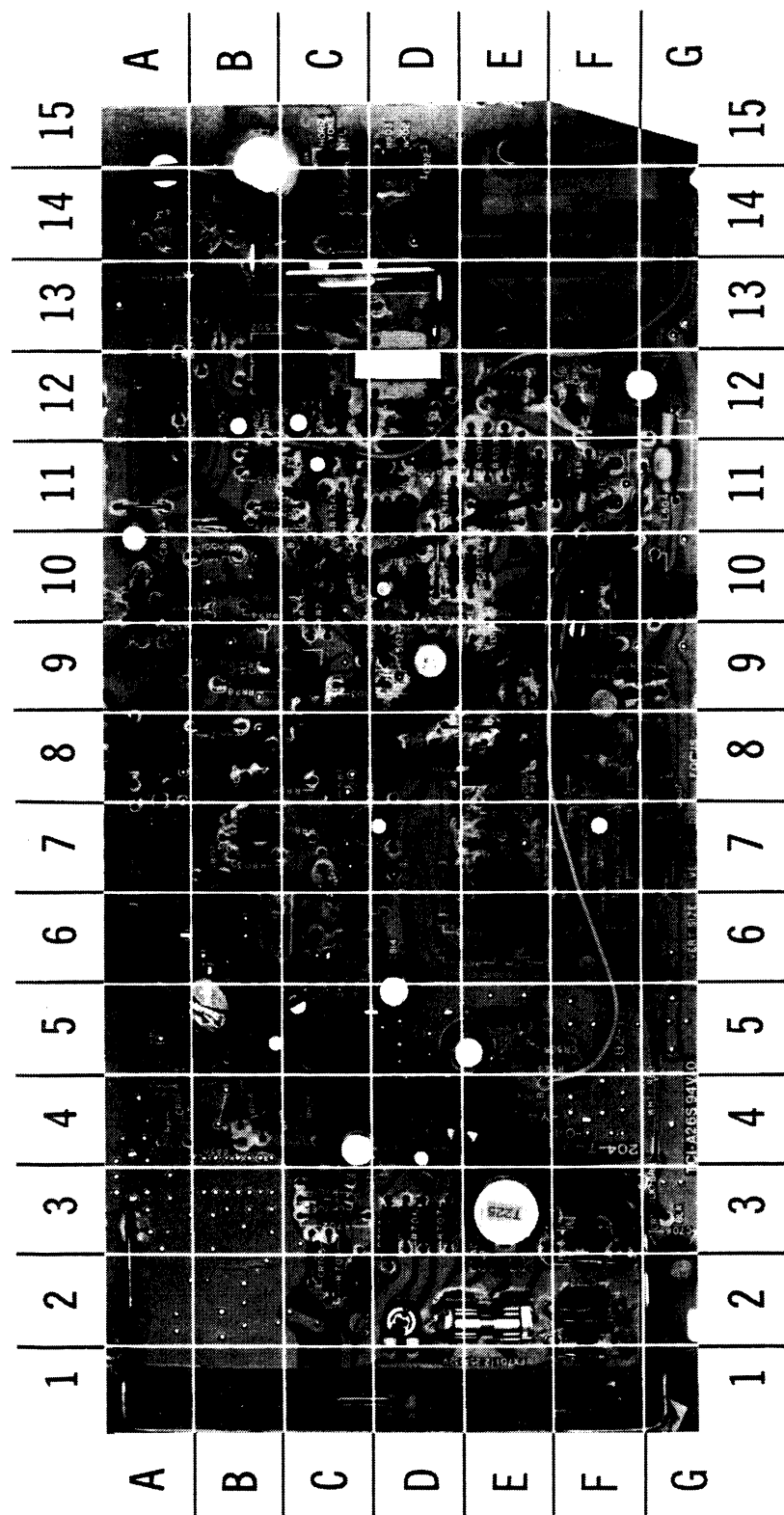
tal Output Transformer (TX502). Also, check Coil L504. If 12.41V is still missing, see "Power Supply" section. If 12.41V is present at the collector of Transistor Q502, inject a horizontal drive signal at the base of Transistor Q502.

If high voltage returns, check Horizontal Driver Transistor (Q501). Also, check voltages, waveforms, and components associated with the Horizontal Processor (IC501). Should the high voltage not return, check Transistor Q502, Diodes CR502 and CR503, Transformer TX502 and associated circuitry. The high voltage rectifier is part of Transformer TX502 and may be defective.

The additional B+ sources developed from Transformer TX502 can cause loading of the horizontal circuit. Check B+ sources rectified by Diodes CR501, and CR504 thru CR506.

Poor horizontal linearity can be caused by the condition of Capacitors C516 and C520. Also, check the horizontal winding of the Deflection Yoke (TX202) and associated circuitry.

ZENITH
MODEL ZVM-121



MAIN BOARD GridTrace LOCATION GUIDE

C501	C12	CR805	B-6	R623	E-9
C502	D-9	CRX701	F-3	R624	D-8
C503	D-11	CRX702	F-2	R626	D-8
C504	D-11	CRX703	F-1	R627	D-9
C505	C-12	CRX704	F-2	R628	F-9
C506	C-11	CRX707	E-3	R629	F-9
C507	D-10	CX711	D-4	R631	F-10
C508	D-10	FX701	E-2	R632	E-10
C509	D-10	IC501	D-11	R701	E-10
C510	D-11	L501	C-12	R702	C-3
C511	C-13	L502	C-13	R703	C-3
C512	D-15	L504	G-11	R704	C-2
C513	C-14	Q501	C-12	R705	D-3
C514	C-15	Q502	C-13	R706	D-3
C515	C-12	Q601	F-6	R707	D-3
C516	B-15	Q602	E-6	R708	D-3
C517	G-12	Q603	D-7	R709	D-2
C518	A-15	Q604	F-9	R711	F-3
C519	A-14	Q606	E-9	R801	A-6
C521	E-12	Q607	G-8	R802	C-7
C522	E-5	Q701	C-2	R803	B-7
C601	C-8	Q702	C-2	R804	A-7
C603	E-8	Q703	C-1	R806	B-4
C604	E-7	Q801	B-7	R807	B-8
C606	E-7	Q802	C-8	R808	C-8
C607	F-7	Q803	C-10	R809	C-8
C608	E-6	Q804	C-9	R810	B-11
C609	F-6	Q805	A-5	R811	C-8
C611	F-7	Q806	C-5	R812	C-4
C613	E-8	R501	D-12	R813	A-5
C614	D-9	R502	D-11	R814	B-4
C615	D-7	R503	C-9	R815	A-4
C616	D-8	R504	D-12	R816	B-8
C617	F-9	R505	E-10	R817	B-8
C618	F-9	R506	C-11	R818	G-13
C701	F-3	R507	C-11	R819	G-13
C702	F-2	R508	E-11	R820	B-4
C703	F-2	R509	E-11	R821	C-6
C704	F-3	R510	D-10	R822	C-6
C706	G-2	R511	E-11	R823	B-11
C708	C-4	R512	E-11	R824	C-10
C709	D-4	R513	E-11	R825	B-10
C801	B-7	R514	D-11	R826	C-4
C802	B-7	R515	F-11	R827	A-8
C803	B-8	R516	F-11	R828	A-12
C804	C-9	R517	D-10	R830	B-9
C805	B-5	R518	E-11	R831	A-10
C806	C-10	R519	F-10	R832	B-9
C807	B-12	R520	E-11	R833	C-10
C808	B-5	R522	C-13	R834	C-6
C809	A-10	R523	B-13	R835	C-5
C811	A-8	R525	C-10	R836	A-10
C812	C-5	R526	C-11	R837	A-10
C813	A-10	R528 *	E-11	R838	A-13
C814	D-5	R529	E-5	R839	A-13
CR501	B-10	R602	D-8	R840	C-6
CR502	D-15	R603	D-7	R841	F-11
CR503	D-15	R604	E-7	R842	F-11
CR504	A-14	R606	F-7	R843	E-12
CR505	E-5	R607	F-7	R844	E-12
CR506	F-12	R608	G-7	R846	C-6
CR507	E-10	R609	E-6	R847	B-6
CR601	E-7	R610	F-7	R848	G-8
CR602	E-8	R611	G-7	R849	D-12
CR603	E-8	R612	E-6	RX521	B-14
CR604	F-8	R613	F-6	RX524	F-12
CR605	E-6	R614	G-6	RX527	G-1
CR705	C-2	R616	E-9	RX712	D-12
CR706	C-3	R618	E-7	T501	F-2
CR801	C-9	R619	E-7	TP10	F-14
CR802	B-11	R620	E-6	TX502	
CR803	A-12	R621	E-6		
CR804	A-4	R622	E-8		

* Located on other side of board.

SAFETY PRECAUTIONS (Continued)

IMPLOSION PROTECTION

1. All Zenith picture tubes are equipped with an integral implosion protection system, but be careful to avoid damage during installation. Avoid scratching the tube.
2. Use only Zenith replacement tubes.

X-RADIATION

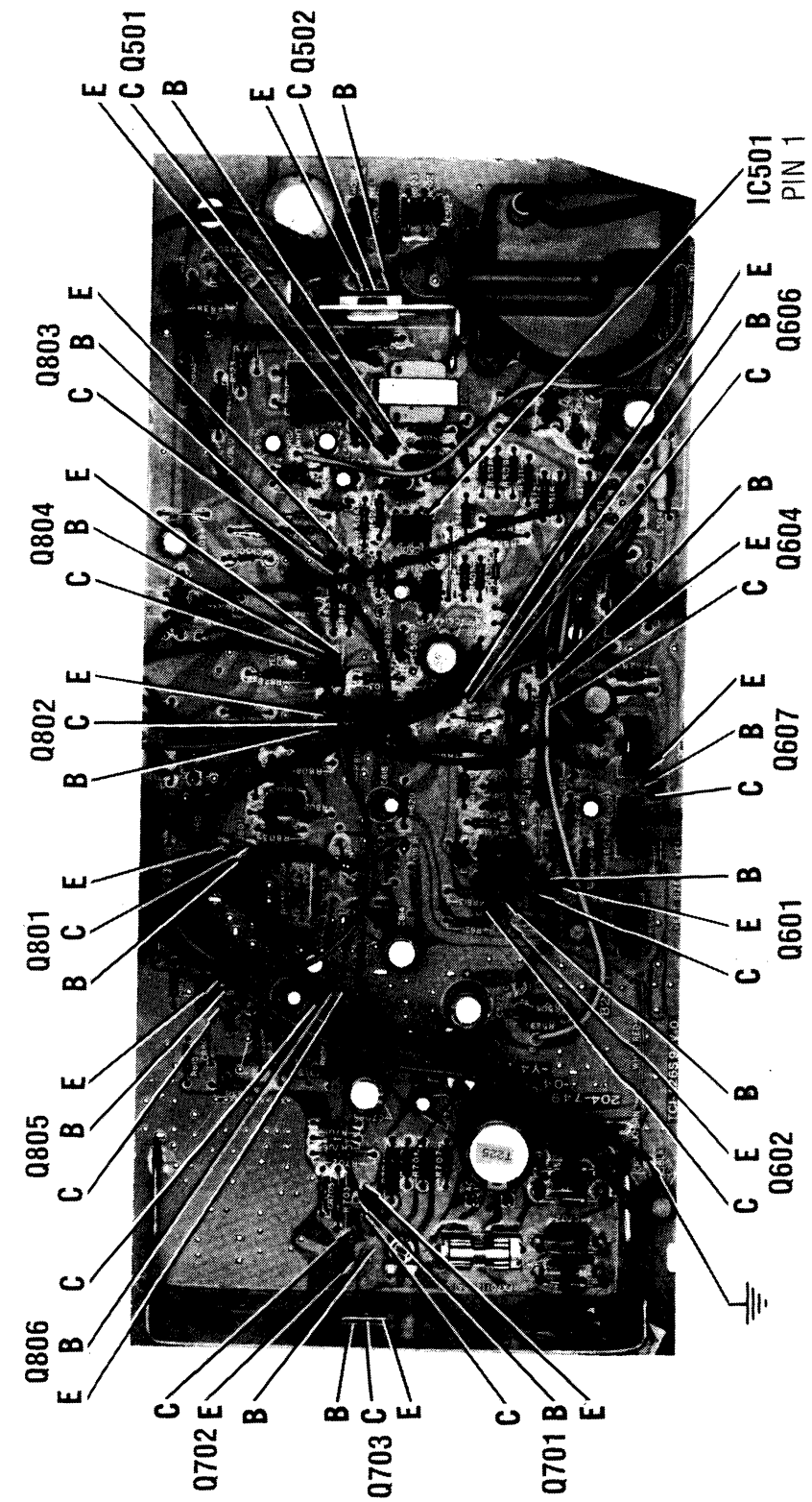
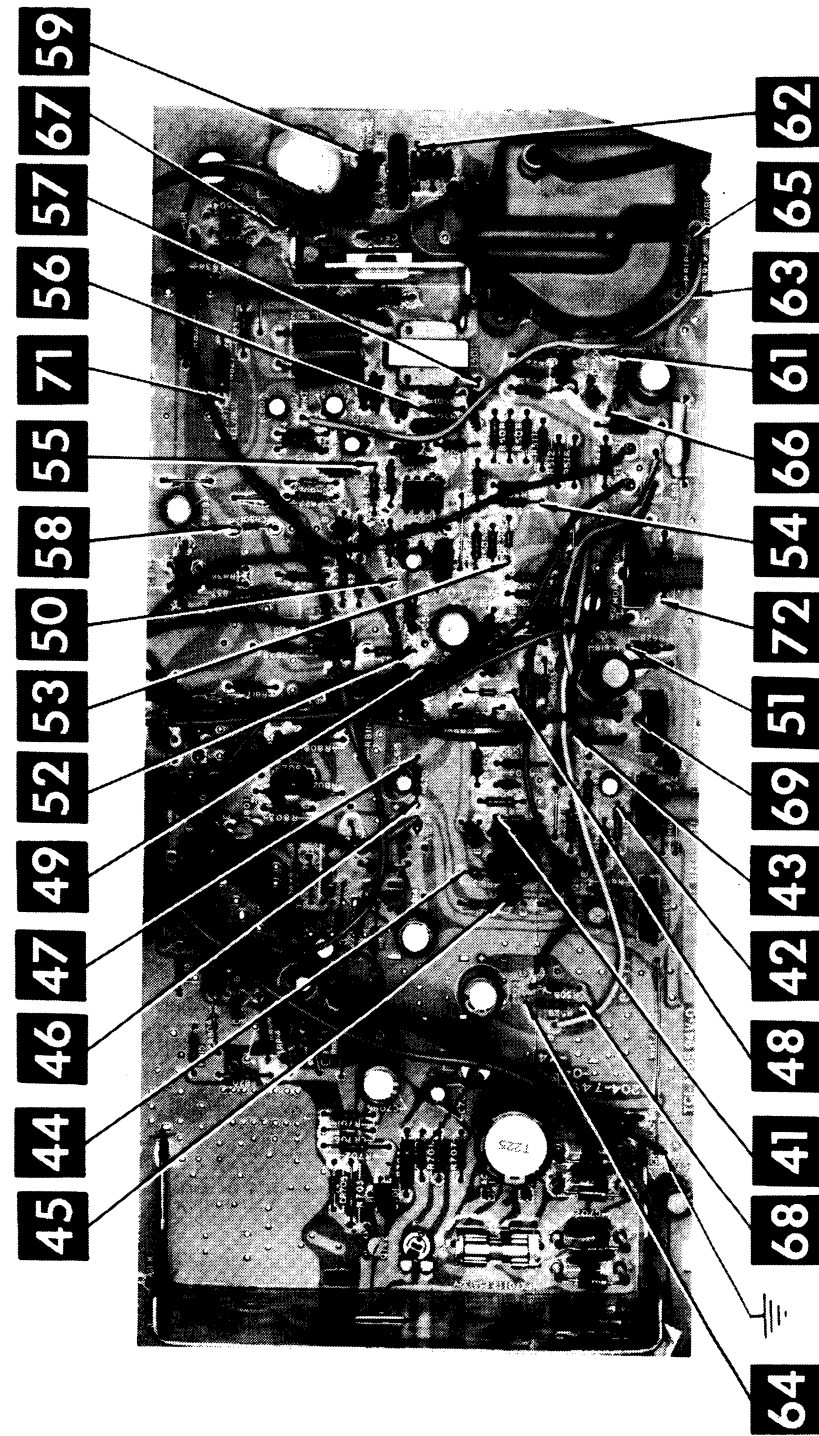
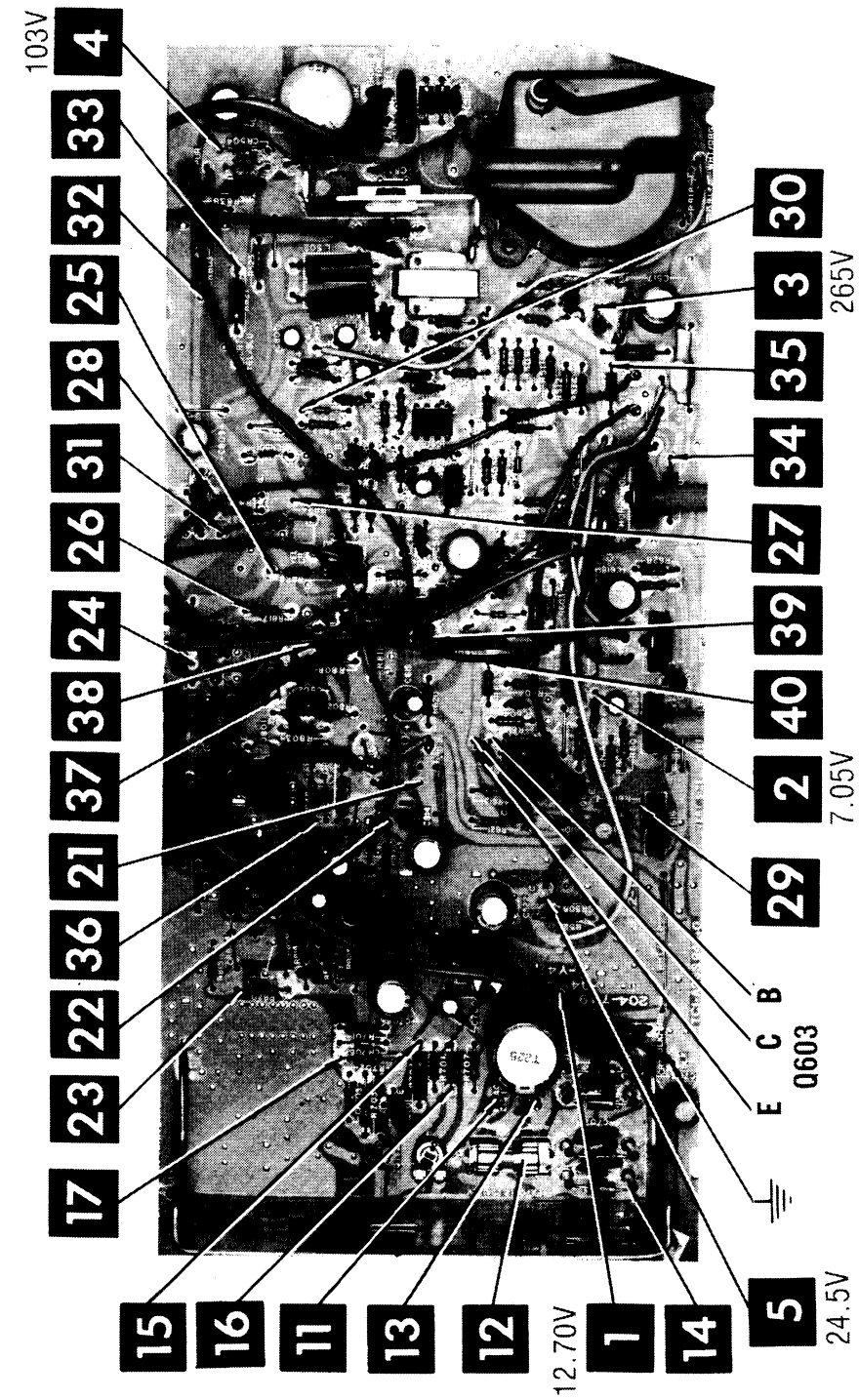
1. Be sure procedures and instructions to all service personnel cover the subject of X-radiation. The only potential source of X-rays in the current Monitor is the picture tube. However, this tube does not emit X-rays when the HV is at the factory-specified level. It is only when the HV is excessive that X-radiation can be generated. The basic precaution which must be exercised is to keep the HV at the factory-recommended level. Refer to the X-Ray Precaution Label which is located inside each Monitor for the correct high voltage. The proper value is also given in the applicable service manual. Operation at higher voltages may cause a failure of the CRT or high voltage supply and, under certain circumstances, may produce radiation in excess of desirable levels.
2. Use only Zenith specified CRT anode connectors.
3. It is essential that the serviceman have an accurate high voltage meter available at all times. Check the calibration of this meter periodically against a

reference standard, such as the one available at your distributor.

4. When the high voltage circuitry is operating properly, there is no possibility of an X-radiation problem. Every time you service a monochrome chassis, run the brightness up and down while you monitor the high voltage with a meter to be certain that the high voltage does not exceed the specified value and that it is regulating correctly. We suggest that you and your service organization review test procedures so that voltage regulation is always checked as a standard servicing procedure, and that the reason for this product routine be clearly understood by everyone. It is important to record an accurate high voltage reading on each customer's invoice.
5. When you are troubleshooting and making test measurements in a Monitor with a problem of excessive high voltage, avoid being unnecessarily close to the picture tube and the high voltage compartment. Do not operate the chassis longer than is necessary to locate the cause of excessive voltage.
6. Models which use a high voltage rectifier vacuum tube should have that tube replaced only with a Zenith recommended replacement type or a Zenith recommended solid-state rectifier replacement. The high voltage compartment and all metal shields, where used, must be kept in place whenever the chassis is operating. If a shield is missing, it should be replaced at once as a standard servicing procedure.

Courtesy of the Manufacturer

CMT2-2 ZENITH
MODEL ZVM-121



PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

TRANSFORMER (Power)

ITEM No.	RATING			REPLACEMENT DATA		
	PRI.	SEC. 1	SEC. 2	MFGR. PART No.	THORDARSON PART No.	NOTES
# TX201	120VAC @ 225mAAC	17VAC @ 960mADC		95-3262-02		
# TX203						
	SEC. 3	SEC. 4	SEC. 5	95-3388-02(1)		

For SAFETY use only equivalent replacement part.
(1) Used in Model ZVM-121-E.

FUSE DEVICES

ITEM NO.	DESCRIPTION	MFGR. PART NO.		NOTES
		DEVICE	HOLDER	
# FX201	4A @ 250V Fast Acting Pigtail 4A 2.25A @ 32V Fast Acting	136-114-23		
# FX202				
# FX701				
		136-113-23(1)		
		136-120-07		

For SAFETY use only equivalent replacement part.
(1) Used in Model ZVM-121-E.

MISCELLANEOUS

ITEM No.	PART NAME	MFGR. PART No.	NOTES
E201	Spark Gap	52-958-04	40/80 Character Select On/Off AC Selector (Used In Model ZVM-121-E)
E202	Spark Gap	52-958-04	
E203	Spark Gap	52-958-04	
E204	Spark Gap	52-958-04	
L501	Ferrite Sleeve	149-379	
L502	Ferrite Sleeve	149-379	
S202	Switch	85-1606	
# SX201	Switch	85-1610	
# SX203	Switch	85-1545-03	
# VX201	CRT	12VCBP31	

For SAFETY use only equivalent replacement part.

CABINET & CABINET PARTS (When ordering specify model, chassis & color)

PARTS LIST AND DESCRIPTION

When ordering parts, state Model, Part Number, and Description

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	TYPE No.	MFGR. PART No.	REPLACEMENT DATA				
			EGG PART No.	GENERAL ELECTRIC PART No.	MOTOROLA PART No.	NTE PART No.	RCA PART No.
CR501	H142	103-142-01	ECG177	GE-300	1N4935	NTE177	SK9091/177
CR502,3	F295-02	103-295-02A	ECG177	GE-300	1N4935	NTE177	SK9091/177
	G1146D	103-261-02A	ECG552	GE-511		NTE552	SK9000/552
	F295-02	103-295-02A	ECG177	GE-300	1N4935	NTE177	SK9091/177
CR504	F295-03	103-295-03A	ECG552	GE-511		NTE552	SK9000/552
CR506	G1146D	103-261-04	ECG552	GE-511		NTE552	SK9000/552
	H142	103-142-01	ECG177	GE-300	1N4935	NTE177	SK9091/177
	H142	103-142-01	ECG177	GE-300	1N4935	NTE177	SK9091/177
CR601 thru CR705	H142	103-142-01	ECG177	GE-300	1N4935	NTE177	SK9091/177
CR706	27	103-279-09A	ECG5009A	GEZD-4.7	1N5230B	NTE5009A	SK4A7/5009A
CR801,2	H142	103-142-01	ECG177	GE-300	1N4935	NTE177	SK9091/177
CR803	G1141D	103-261-02A	ECG116	GE-504A	1N4003	NTE116	SK3311
CR804,5	H142	103-142-01	ECG177	GE-300	1N4935	NTE177	SK9091/177
# CRX701,2	G1146D	103-261-04	ECG552	GE-511		NTE552	SK9000/552
# CRX703	G1210D	103-261-04	ECG552	GE-511		NTE552	SK9000/552
# CRX704	G1146D	103-261-04	ECG552	GE-511		NTE552	SK9000/552
IC501	221-141	221-141	ECG815	GEIC-244	MC139 IP	NTE815	SK3255/815
Q501	819	121-819	ECG108	GE-375	MPS6543	NTE108	SK3452/108
# Q502	1028-01	121-1028-01	ECG575			NTE375	SK9118/375
Q601,2	699	121-699	ECG159	GE-82	2N5401	NTE159	SK3466/159
Q603	975	121-975	ECG123AP	GE-123AP	MPSA05	NTE123AP	SK3854/123AP
Q604	819	121-819	ECG108	GE-123AP	MPSA05	NTE108	SK3854/123AP
Q606	1036	121-1036	ECG298	GE-272	2N4401*	NTE298	SK3452/108
Q607	819	121-819	ECG108	GE-82	MPS6543	NTE108	SK3452/108
Q701	699	121-699	ECG159	GE-82	2N5401	NTE159	SK3466/159
Q702	975	121-975	ECG123AP	GE-123AP	MPSA05	NTE123AP	SK3854/123AP
# Q703	992-01	121-992-01	ECG291	GE-302	MJE15030	NTE291	SK3440/291
Q801,2	895	121-895	ECG123AP	GE-123AP	MPSA05	NTE123AP	SK3854/123AP
Q803	69901	121-699-01	ECG159	GE-82	2N5401	NTE159	SK3466/159
Q804	121-990	121-990	ECG171	GE-27	MPSU10	NTE171	SK3201/171
Q805,6	895	121-895	ECG123AP	GE-123AP	MPSA05	NTE123AP	SK3854/123AP

For SAFETY use only equivalent replacement part.
* Lead configuration may vary from original.

CMT2-2 ZENITH
MODEL ZVM-121

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

WIRING DATA

High Voltage Lead	Use BELDEN No. 8869 (17 KV)
Shielded Hook-up Wire	Use BELDEN No. 8401 or 8421 (Single-Conductor)
	8208 (Two-Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No. 8529 (Solid) Available in 13 Colors
	8522 (Stranded) Available in 13 Colors
Power Cord	Use BELDEN No. 8895 (Polarized Interlocking Type)

ELECTROLYTIC CAPACITORS

ITEM No.	RATING	MFGR. PART No.	ITEM No.	RATING	MFGR. PART No.
C505	10 16V	22-7151-04	C617	22 16V	22-7151-05
C506	1 50V	22-7153	C618	47 25V	22-7152-07
C509	1 50V	22-7153	C706	10 50V	22-7153-04
C516	10 25V 20% NP	22-7313	C708	220 10V	22-7150-09
C517	220 16V	22-7151-09	C709	10 16V	22-7151-04
C518	4.7 160V	22-7674-01	C807	10 16V	22-7151-04
C520	10 25V 20% NP	22-7313	C808	1 50V 20% NP	22-7407-01
C522	100 35V	22-7154-08	C809	1 160V	22-7674-02
C607	10 16V	22-7151-04	C812	22 16V	22-7151-05
C609	10 16V 20%	22-7456-01	C814	100 10V NP	22-7403-09
C614	220 16V 20%	22-7579-06	CX707	2200 25V	22-7152-13
C615	1 25V 20%	22-7389-02	CX711	220 16V	22-7151-09

For SAFETY use only equivalent replacement part.

CAPACITORS

ITEM No.	RATING	MFGR. PART No.	ITEM No.	RATING	MFGR. PART No.
C201	.0027 500V	22-7763	C604	470 50V 10%	22-7613-08A
C202	.0027 500V	22-7763	C606	.1 50V 5%	
C501	.01 50V	22-7614-24A		.1 50V 10%	22-7547
C502	.022 50V	22-7615-08B	C608	.1 50V 5%	
C503	.022 50V	22-7615-08A		.1 50V 10%	22-7547
C504	.022 50V 10%		C611	.01 50V 10%	22-7613-24A
	.022 50V	22-7615-08A	C613	.022 50V 10%	22-7179
C507	.01 50V	22-7615-06A	C616	.01 50V 10%	22-7613-24A
C508	.0056 100V 10%	22-7739-09	C701	.0015 500V 5%	22-7244
C509	.01 50V	22-7615-06A	C702	.0015 500V 5%	22-7244
C510	.001 500V	22-7433	C703	.0015 500V 5%	22-7244
C511	.001 500V	22-7433	C704	.0015 500V 5%	22-7244
C512	330 500V 10%	22-3255	C801	820 50V 10%	22-7613-11A
C513	.001 500V	22-7433	C802	.047 50V 10%	22-7071
C514	.027 200V 5%	22-7612	C803	.0047 50V	22-7614-20A
C515	.001 500V	22-7433	C804	220 50V 10%	22-7613-04A
C519	.0047 500V	22-4782	C805	.001 50V 10%	22-7613-12A
C521	.0047 500V	22-4782	C806	.0047 50V	22-7614-20A
C601	.01 50V 10%	22-7613-24B	C811	56 NPO 50V 10%	22-7622-28A
C603	.01 50V 10%	22-7613-24A	C813	220 50V 10%	22-7613-04A

For SAFETY use only equivalent replacement part.

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

CONTROLS (All wattages 1/2 watt, or less, unless listed)

ITEM NO.	FUNCTION	RESISTANCE	MFGR. PART NO.	NOTES
R203	Contrast	1000	63-10770-09	
R204	Black Level	2M	63-10770-08	
R519	Horiz. Hold	3000	63-10637-09	
R612	Vert. Hold	250K	63-10637-04	
R616	Vert. Size	300K	63-10521-04	
# R709	B+ Adjust	10K	63-10817	
R849	Focus	2600	63-10521-05	

For SAFETY use only equivalent replacement part.

RESISTORS (Power and Special)

ITEM No.	RATING	REPLACEMENT DATA		
		MFGR. PART No.	WORKMAN PART No.	REMARKS
R517	15K 2% 1/4W Carbon Film	63-9920		
# R529	10 5% 1/4W Metal Film	63-10559-24	22-2254	
# R711	9.1 5% 1/2W Carbon	63-7968-59		
R816	820 2% 1/4W Carbon Film	63-9919-70	22-2240	
R817	240 2% 1/4W Carbon Film	63-9919-57		
R824	2400 2% 1/4W Carbon Film	63-9919-81		
R837	270 2% 1/4W Carbon Film	63-9919-58	22-2234	
# RX211	2.2M 5% 1/4W	(1)		
# RX212	1.5M 5% 1/2W	63-10526		
# RX521	6.8 5% 1/4W Metal Film	63-10559-20		
# RX524	10 5% 1/4W Carbon Film	63-10559-24	22-1048	
# RX527	680 5% 1/2W Carbon Film	63-10565-68	22-2092	
# RX712	15 5% 7W WW	63-10449-52		

For SAFETY use only equivalent replacement part.
(1) Used in Model ZVM-121-E.

COILS (RF-IF)

ITEM No.	FUNCTION	MFGR. PART No.	ITEM No.	FUNCTION	MFGR. PART No.
L503	Linearity	20-3906-03			
# L504	RF Choke	20-3984			

For SAFETY use only equivalent replacement part.

COILS & TRANSFORMERS (Sweep Circuits)

ITEM No.	FUNCTION	REPLACEMENT DATA		
		MFGR. PART No.	OTHER IDENTIFICATION	THORDARSON PART No.
# L505	Width	20-3943-02		
TX202	Yoke Horiz 113uH	95-3438		
T501	90° Vert 49mH			
# TX502	Horiz Driver	95-3136-03		
	Horiz Output	95-3434		

For SAFETY use only equivalent replacement part.

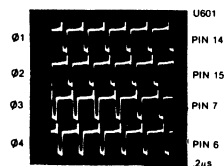
The following information is just a sample of the many valuable time saving features contained in this exclusive Sams **COMPUTERFACTS** publication:

-
- Figure 1 is a schematic diagram of the control circuit for the 1000 Hz sine wave generator. The circuit includes two 74LS03N inverters (PART OF U06) and a 74LS04N inverter (PART OF U08). The 74LS03N inverters are connected to a 13V supply and a 64V supply. The 74LS04N inverter is connected to a 4.73V supply and a 2200 ohm resistor. The circuit is powered by a 4.8V supply and a 5V supply, both with 1µs and 2ms timing parameters.

- Step by Step Troubleshooting guides the technician through the necessary procedures to quickly locate the problem.

MICROPROCESSOR CHIP (CPU) OPERATION

Verify the processor is functioning by checking the signals on the address lines (pins 10 thru 24 of IC U600) and the data lines (pins 41 thru 56) using a logic probe or a scope. If a logic probe is used, refer to the "Logic Chart" for the correct readings. If a scope is used, the waveforms on the address lines (except pins 22 and 23 which have no signal in Power Up mode) should be similar to Figure 1. The waveforms on the data lines should be similar to Figure 2.

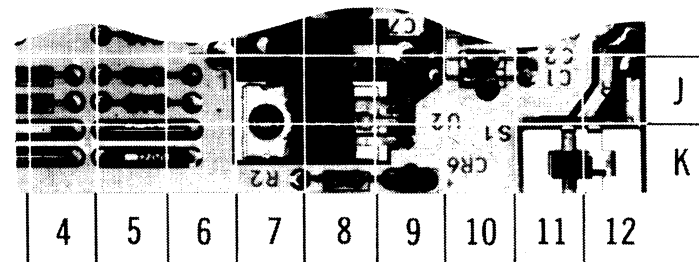


- Complete Components Parts List in an easy to use format with field replacements shown when possible. SAMS unique semiconductor, chip and IC cross-reference gives you many replacements to choose from and is available at your Electronic Distributor.

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	TYPE No.	MFR. PART No.	REPLACEMENT DATA						
			ECG PART No.	GENERAL ELECTRIC PART No.	MOTOROLA PART No.	NTE PART No.	RCA PART No.	WORKMAN PART No.	ZENITH PART No.
D102	1SS53	1149-2576	ECG519	GE-514	1N4935	NTE519	SK9091/177	WE925/519	103-131
D103	60F4M	1149-2527	ECG109	1N60		NTE109	SK3088	WE134/109	103-29001
D201	1N4004GP	1201-4205	ECG116	GE-504A	1N4004	NTE116	SK3312	WE157	212-76-02
D501 thru D503	1SS53	1149-2576	ECG519	GE-514	1N4935	NTE519	SK9091/177	WE925/519	103-131

- Quick Component Location using the SAMS exclusive GRIDTRACE, CIRCUITRACE, and component photographs.



- Logic Chart containing logic probe readings to isolate defective circuitry and components.

LOGIC

PIN NO.	IC U100	PIN NO.	IC U100	PIN NO.	IC U102	IC U103	IC U104	IC U105	IC U106	IC U107	IC U108	IC U109
1	P	21	P	1	L	L	L	L	L	L	L	L
2	P	22	P	2	P	P	P	P	P	P	P	P
3	P	23	P	3	H	H	H	H	H	H	H	H

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